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THE
INSIDE PASSAGE TO ALASKA

1792-1920

Volume II



THE INSIDE PASSAGE TO ALASKA

1792-1920

with an account of the North Pacific Coast from
Cape Mendocino to Cook Inlet, from the ac-
counts left by Vancouver and other early
explorers, and from the author's jour-
nals of exploration and travel in
that region

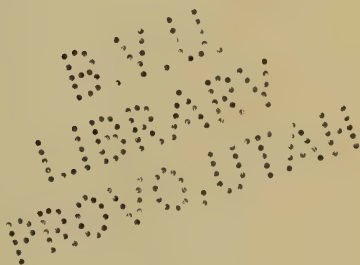
by

William Watson Woollen

edited from his original manuscripts by

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Volume II



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Dixon Entrance and Alaska

Vancouver, in the morning of Friday, August 2, 1793, from a point of land situated in latitude $54^{\circ} 45\frac{1}{2}'$, longitude $229^{\circ} 28'$, saw the Pacific Ocean between N. 88 W. and S. 81 W. In doing this the Pacific was seen through Dixon Entrance. Captain Juan Perez, a Spanish navigator and explorer, in July, 1774, struck the coast of Queen Charlotte Island and pursued it up to Cape North in latitude $54^{\circ} 15'$. The strong currents running out of Dixon Entrance, not so named at that time, prevented him from rounding the cape and entering the entrance. On August 9, 1786, the famous French navigator La Perouse entered the waters of the entrance about the present boundary line, but was unable to explore it. Captain George Dixon, an English navigator, on July 1, 1787, passed the boundary line and was off the "deep bay," whose currents had baffled Juan Perez thirteen years before. From this time the entrance has borne Dixon's name.

Dixon Entrance extends from Cape Muzon and North Island in a general east-northeast direction to the Dundas Islands, a distance of sixty miles, with an average width of about thirty miles; it then contracts to a width of eight miles between Cape Fox and Dundas Islands, and continues with this width to the mouth of Portland Inlet, a distance of seventeen miles. It is of importance as forming one of the deep-water inlets to southeast Alaska from the sea, and as one of the connecting waters of the Inside Passage. The boundary

line between British Columbia and Alaska runs through Dixon Entrance from Cape Muzon in latitude $54^{\circ} 40'$, longitude $132^{\circ} 40'$. This cape is a high and somewhat sloping headland, with apparently a strip of lower land in front of it, formed by several wooded islets close to it.

As has already been stated, the boundary line between British Columbia and Alaska extends through Dixon Entrance; this being true, it is well at this juncture to take some account of Alaska. The name Alaska is derived from an English corruption of the native word *Al-ay-ek-sa*, probably meaning "the Great Land." The region now known as Alaska was first explored by the Russian officers Bering and Chirikof, in 1741. Russian traders and trappers soon entered the region. Spanish expeditions, in 1774 and 1775, visited the southeastern shore and, in 1778, Captain James Cook, the English explorer, made extensive surveys of the coast for the British government. The first settlement was made by the Russians at Three Saints on Kodiak Island in 1784, and, in 1804, the Russian American Company founded Sitka, making it the seat of government in the following year. In 1790, the trade and regulations of the Russian possessions in America were given over to the Russian American Company for a term of twenty years, and this was afterwards twice renewed for similar periods. In 1821, Russia attempted by ukase to exclude foreign navigators from the Bering Sea and Pacific coast of her possessions; this caused a controversy with the United States and Great Britain. The question was settled by a treaty with the United States in 1824 and one with Great Britain in 1825, by which treaties the boundaries of the

Russian possessions in America were permanently fixed.

In March, 1867, Alaska was purchased by the United States for the sum of \$7,200,000, payable in gold, and, in October of the same year, the formal transfer was made at Sitka. The sale had been a matter of comment and discussion for many years before its purchase was consummated. In 1859, during the administration of President Buchanan, the Russian minister at Washington was approached by an unofficial representative and sounded as to the willingness of his country to make such a sale. Being asked quickly what the United States would pay, the unofficial representative was a bit nonplussed for the moment, but presently replied, "Oh! – about five million dollars." He then hastened to the assistant secretary of state and reported the offer to him. The latter then approached the Russian minister, with the result that the matter was brought definitely before the government. Just about this time, the Civil War broke out, and the negotiations between the two governments were broken off.

During the intervening years, the people of what is now the state of Washington had become deeply interested in the fisheries of the North Pacific and through their legislature petitioned the president of the United States to obtain for them permission from the Russian government to fish in the Alaska waters. It was this that revived the discussion in regard to the purchase of Alaska. Russia was sorely in need of money and directed Archduke Constantine, brother of the Czar, to instruct Baron Stoeckle, the Russian minister at Washington to proceed with the negotiations and upon their consummation, to cede the territory of

Alaska to the United States. Accordingly the Russian minister, in the spring of 1867, opened the negotiations with William H. Seward, secretary of state, and, within a month, an agreement was effected and a treaty of cession executed. There was some parleying at first over the price, but the matter was one presenting so many mutual advantages that this was soon satisfactorily arranged. The price first agreed upon was seven million dollars, but Mr. Seward offered to increase the amount by two hundred thousand dollars on condition that Russia should cede the territory unencumbered by any reservations, privileges, grants, or possessions by associated companies of Russia or any power or nation. This finally was agreed upon on Friday evening, March 25, 1867. At that time Mr. Seward was playing whist with members of his family, when Baron Stoeckle, the Russian minister was announced. He stated that he had received a dispatch by cable from his government, conveying the consent of the Emperor to the cession. "Tomorrow," he added "I will come to the department, and we can enter upon the treaty." With a smile Seward replied: "Why wait till tomorrow? Let us make the treaty to-night." "But your department is closed. You have no clerks, and my secretaries are scattered about town." "Never mind that," said Mr. Seward; "if you can muster your legation before midnight, you will find me awaiting you at the department." By four o'clock on the following morning, the treaty was engrossed, sealed, and ready for transmission by the president to the senate, by which it was duly ratified.

Alaska was thought not to possess any value beyond its seal fisheries, and these had been but little developed. Russia would gladly have disposed of it years

before she did. Its purchase by the United States came as a great surprise, and Secretary Seward was both ridiculed and abused for his alleged folly in purchasing a region supposed to be principally productive of glaciers and icebergs. Even Seward had no idea of the immense undiscovered resources and further possibilities of the new acquisition. The purchase continued to be unpopular for many years. "The great country was declared to be a barren, worthless, God-forsaken region," whose only products were its "icebergs and polar bears;" its vegetation was "confined to mosses," and "Walrussia" was wittily suggested as an appropriate name for the new purchase. This condition and estimation of the country continued until gold was found in paying quantities; since then the development of the territory has been phenomenal. The subjoined table shows the immense results of that development after the acquisition of the territory by the United States:

<i>Minerals</i>	<i>1917</i>	<i>1918</i>	<i>1867-1918</i>
Gold . . .	\$14,657,353	\$10,000,000	\$302,758,009
Copper . . .	24,240,598	17,180,000	105,824,470
Silver . . .	1,021,060	870,000	5,620,466
Tin	114,462	98,343	792,657
Lead	146,584	60,256	429,604
Antimony . .	8,973	184	217,157
Tungsten . .	19,550	11,000	85,420
Chrome ore, palladium and platinum		106,000	106,000
Coal	265,317	435,000	1,121,150
Marble, gypsum, petroleum, etc.	217,990	120,000	2,263,861
Total . . .	\$40,691,887	\$28,880,783	\$419,218,794

Fish Products

Salmon . . .	\$47,778,081	\$53,277,720	\$316,201,463
Halibut, cod, herring, etc.	2,571,677	4,374,850	21,055,743
Clams, crabs, shrimps, etc.	278,101	218,923	573,695
Fertilizer and meal . . .	144,033	168,552	1,252,613
Oil . . .	689,588	846,362	7,021,482
Whalebone .	5,500	1,644	1,446,737
Total . .	\$51,466,980	\$58,888,051	\$347,551,733

Furs and Skins

Sealskins . .	\$ 247,200	\$ 924,570	\$ 52,588,600
All other furs	1,064,399	1,277,350	26,604,270
Total . .	\$ 1,338,599	\$ 2,201,920	\$ 79,192,870

Miscellaneous

Wood, curios, etc.	91,619	255,885	1,756,011
Grand Total	\$93,589,085	\$90,226,639	\$847,719,408

It will be observed that the foregoing table does not take into account the forests and lumber of Alaska. Its forests are among the finest of the United States. Those on the coast, which comprise the most heavily timbered areas in the territory, are nearly all included in the Tongass and Chugach national forests. These are under the jurisdiction of the Forest Service of the United States Department of Agriculture. A forest supervisor, with headquarters at Ketchikan, is locally in charge of their administration. Settlers, farmers, prospectors, fishermen, or similar persons may take timber from these forests for personal use without formal permit and free of charge, in amounts not exceeding 20,000 feet board measure, or twenty-five cords of wood, in any one year. All mature timber which may be cut with benefit to the forest will, upon application, be offered for sale at not less than its appraised value.

Fishes and Fish-like Foods of the North Pacific

A substantial part of the food upon which Vancouver and his men existed while exploring the North Pacific coast consisted of fish which they took with the seine or hook or procured from the natives. Perhaps the second most interesting incident that occurred to him in making the survey of Behm Canal was the finding the whole head of Burroughs Bay "strewn over with salmon, either dead or in the last stages of their existence." He says, "We had no difficulty to take as many of the best as we were enabled to make use of." One almost wonders that they could make use of any of them for they "had little of the color, and nothing of the flavor of salmon." This incident and the fact that during this survey the ships were at anchor in Salmon Bay, so named because of the abundance of that species of fish found in the bay, makes this an opportune time to take some account of the fishes and fish-like foods of the North Pacific.

From 1893 to 1896 the fisheries in the boundary waters between Canada and the United States were made the subject of inquiry by an international commission, composed of Dr. William Wakeham of Ottawa, as the representative of Great Britain, and Richard Rathbun, assistant secretary of the Smithsonian Institute, on behalf of the United States. The interesting region at the western terminus of the boundary

line between the two countries was by Commissioner Rathbun described in his report to his government in 1897, as a nearly land-locked sea, having especially noteworthy characteristics, the most important of which was its fishery wealth, shared in somewhat equal proportions by both countries. The sea examined by the commissioners is elongate in shape and extends in a general northwest and southeast direction a distance of over two hundred miles. Its southern end extends some fifty miles or more into the state of Washington, while its middle and northern parts lie between Vancouver Island, on the west, and the mainland of Washington and British Columbia, on the east. The report of Commissioner Rathbun further says: "The fishery resources of this region comprise a wide variety of products belonging both to the sea and its tributary waters, many of which were exceedingly abundant and some of high commercial value." Of these he mentioned the white sturgeon, *acipenser transmontanus*, and the green sturgeon, *acipenser medirostris*; the herring, *clupea pallasii*; the American or common shad, *alosa sapidissima*; the California sardine, *clupanodon caeruleus*; the California anchovy, *engraulis mordax*; five species of salmon, genus *oncorhynchus*, namely, humpback salmon, *O. gorbuscha*, dog salmon, *O. keta*, chinook or quinnat salmon, *O. tshawytscha*, silver salmon, *O. kitsutch*, blueback or sockeye salmon, *O. nerka*; and one species of the genus *salmo*, namely, steelhead trout, *S. gairdneiri*; the euchalon or candle fish, *thaleichthys pacificus*; the Pacific smelt, *osmerus thaleichthys*, and surf smelt, *hypomesus pretiosus*; several unnamed rockfishes; the beshow or black codfish, *anoplopomidæ fimbria*; cultus cod, *ophidion elongatus*; the tomcod, *microgadus proximus*; numerous unnamed

rockfishes, genus *sebastodes*; also, the small, native oyster, several unnamed species of clams, large crabs belonging to the genus *cancer*, shrimps, and prawns. From this large enumeration of fish products it would seem that Vancouver and his men ought to have obtained an abundant supply; notwithstanding he quite frequently complained of their inability to obtain such a supply.

The white or Pacific sturgeon and the green sturgeon are found in the Pacific coast waters of America from Monterey, California, north to Alaska. They ascend the Sacramento, Columbia, and Fraser rivers. The former of these enters the Fraser River about the end of April and spawn, although little or nothing is known about the period. They are taken by spearing or by night-lines, baited with salmon, and very often they are caught in the nets of the salmon fishers. They grow to an enormous size, some of them measuring thirteen feet in length and from seven to nine hundred pounds in weight, and it is said that one was caught that weighed over one thousand pounds. The roe of this sturgeon is used in making caviar, and the bladders are manufactured into isinglass: The process of making the caviar has been described as follows: "After the eggs have been removed from the fish, they are placed in large masses upon a stand, the top of which is formed of a small-meshed screen. On the under side is placed a zinc-lined trough, about eighteen inches deep, two feet wide, and four feet long. The operator gently rubs the mass of eggs back and forth upon the screen, whose mesh is just large enough to let the eggs drop through as they are separated from the enveloping membrane. They thus fall into the trough, from which they are drawn off into tubs through a sliding door in one end

of the trough. After all of the roe has been separated, the tub is removed, and a certain proportion of the best Lunenburg salt is added and mixed with the eggs by careful stirring with the hands. This is the most delicate part of the whole process, and the best results can be obtained by that proficiency which comes from long experience. After adding the salt, the eggs at first become dry, but in ten or fifteen minutes the salt has drawn from the eggs their water constituents and a copious brine is formed, which is poured off when the tub becomes too full. The salted eggs are then poured into fine-meshed sieves which hold about ten pounds each, where they are allowed to drain for eight to twenty hours. The eggs have now become the caviar of commerce, which is put in casks or cans of various sizes."

The green sturgeon is not so abundant as the white. The habits of the two species do not differ materially, but in size it is much smaller than the white sturgeon. It does not reach a length to exceed seven feet and a weight of one hundred and fifty pounds. Its flesh is dark, has a strong, disagreeable taste and an unpleasant odor, and as a food is regarded quite inferior to that of the white sturgeon. The flesh brings only a nominal price, and the roe is not utilized at all. The catch of sturgeons has never been very large and the sturgeon fisheries of the Pacific coast are now quite depleted.

In America there are but two species of the true herrings, genus *clupea*, namely, the common herring, *C. harengus*, of the Atlantic, and the California herring, *C. pallasii*, of the North Pacific. It is said that the former is beyond question one of the most important fishes in the Atlantic, if not of the world. The latter

is found in the Pacific from San Diego to Kamchatka. It is scarcely different in appearance, size, quality, or uses from the Atlantic species. Seventy-one examples of it taken at Uyak Bay weighed 47.75 pounds, making an average weight of 10.76 ounces. The average length was 11.67 inches. This herring is incredibly numerous in the waters of the northwest coast at all seasons of the year, but more particularly during the winter and spring months. The rôle played by it is of diversified character. It is a valuable food fish, the Orient being the chief market at present for the Alaska product; it is the making of the halibut fishery on account of its use for bait; it is utilized extensively in the manufacture of fertilizer, oil, and fish meal, and it is also consumed in enormous quantities by other fishes. The Indians at Auk Bay and other places put brush in the water each spring during the spawning season for the purpose of securing herring eggs which they dry and make use of as a food delicacy. The adhesive tendency of the eggs makes it an easy matter to thus secure large quantities with but comparatively little effort. Countless millions of the eggs are in this manner destroyed by the Indians. Herrings are captured chiefly by means of small-meshed purse seines, by which means all sizes of the fish are landed. The larger fish are selected for food and the smaller ones are available for bait in the halibut industry.

The genus *clupanodon* is closely allied with that of *clupea*, which it resembles in form of body and the weak, ventral serratures. It differs, however, in having no teeth on the vomer; teeth in jaws mostly weak; and scales thin and deciduous. There are about six species in this genus. Of this genus, the California sardine, *C. caruleus*, is found from Puget Sound south-

ward to Magdalena Bay. It is abundant in the waters of Puget Sound, where it seems to be present during only a brief period of the warmer part of the year. It spawns in the open sea. It is an excellent food fish and reaches the length of a foot.

The shad is a well-known fish of the herring family, of the genus *alosa*, differing from the herrings proper in having the center of the upper jaw deeply notched. The lower jaw is the longer one; the teeth are small and deciduous, in the jaws only; the air bladder is simple, opening from the stomach. The common or Atlantic shad, *A. sapidissima*, is about twenty inches long and weighs from two to six pounds and is an anadromus fish which passes most of its life in the sea performing annual migrations to the rivers for the sole purpose of reproduction. After entering the rivers it takes but little of any kind of food. In ascending the rivers the males precede the females. Little is known of its life in the ocean, the places to which it resorts are unknown, and but little is known regarding its food. At various times between 1871 and 1886, 619,000 fry of this shad were planted in the Sacramento River, and in 1885 and 1886, 910,000 were placed in the Columbia River. The experiment proved successful. The young shad found the environments congenial. Suitable spawning grounds were found, and they have thrived so well that they have spread to San Diego on the south and Kasilof, Cook Inlet on the north. In 1903 the fishermen at Birch Point took about three thousand in one day. It is now one of the most abundant and most delicious fishes in the markets of San Francisco and other coast cities.

Of the genus *engraulis*, the California anchovy, *E. mordax*, is the only species found in the waters of the

North Pacific coast. Its range is from Lower California north to south Alaska. In Puget Sound it occurs from May to November in immense schools, and offers an exceptional opportunity for the preparation of "sardines." It is one of the largest anchovies and a valuable food-species. The flesh is rich and oily and comparatively dark. It is utilized, to some extent, both as food and for bait. Its length is about seven inches.

The most valuable commercial fisheries in the world, excepting only the oyster and herring fisheries, are those supported by the salmons. Of these the most important by far are the salmon fisheries of the Pacific coast of North America, where California, Oregon, Washington, British Columbia, and Alaska possess industries representing millions of dollars of investment and millions of output annually.

The Pacific coast salmons are all included in the genus *oncorhynchus*. With them some fishermen incorrectly class the steelhead trout, *Salmo gairdneri*, which belongs to *Salmo*, a closely-related genus. As long ago as 1731, the species *oncorhynchus* were first made known by Steller, the naturalist, who almost simultaneously with Krascheninikov, another early investigator, distinguished them with perfect accuracy under their Russian vernacular names. In 1792, Walbaum adopted these vernacular names in a scientific nomenclature for these fishes. This genus consists mostly of large sized salmon which ascend the rivers tributary to the North Pacific in America and Asia. The five species of this genus found in the waters of the North Pacific range northward from Monterey Bay on the American coast and Japan on the Asiatic, the extreme northern distribution of certain of the

species having not yet been accurately determined. The species included are (1) humpback or pink salmon, *O. gorbuscha*; (2) Dog or chum salmon, *O. keta*; (3) chinook, quinnat, tyee, spring or king salmon, *O. tshawytscha*; (4) silver, coho, or white salmon, *O. kisutch*; and (5) blueback, red or sockeye salmon, *O. nerka*.

Professor Jordon and Everman say: "Observations made by us and others elsewhere show that the individuals of all the species of *oncorhynchus* die after once spawning, whether the spawning-beds be remote from the sea or only a short distance from salt water. As soon as they reach fresh water their appetites grow less, their throats begin to narrow and their stomachs to shrink. This does not at first entirely prevent them from feeding but it changes them enough to overcome the temptation to return to their well-stocked feeding grounds in the ocean and the longer they remain in fresh water the greater are they changed and the desire to go back for food is correspondingly lessened. This change comes about gradually, increasing day by day from the time they reach the tide waters until at the near approach of the spawning season their throats and stomachs become entirely incapacitated for receiving food and the desire and ability leaves them entirely. The cause of their dying is deep-seated in their nature and general in its application. The cause is the same as that which compasses the death of the ephemera or may-fly after an existence of but a few hours, or of the corn-plant or melon-vine and all annual plants at the end of one season."

The humpback or pink salmon or "haddo" of the Indians, *O. gorbuscha*, is the smallest of the American species, weighing from three to eleven pounds, the

average being about four pounds. In color it is bluish above, silvery below, the posterior and upper parts with many round black spots, the caudal fins always having a few black spots, oblong in shape. The males in the fall are of a dirty red color and are very much distorted in shape, a decided hump appearing on the back, from which deformity the species acquires its name. Its southern limit is the Sacramento River, but only occasional specimens are found there and in the rivers to the northward until Puget Sound is reached. Here a large run appears every other year, chiefly during the month of August, the only place on the coast where such is the case. During the years of their occurrence they are exceedingly abundant. They are said to move slowly, in large schools, rolling in the water somewhat after the fashion of the porpoise, with the dorsal fin showing on the surface. It occurs in varying abundance in the waters of British Columbia, but it is in the waters of southeast Alaska where it appears in its greatest abundance. There it exists in millions, swarming everywhere along the shores and in the waters near the sea, in streams, brooks, lakes, swamps, and brackish lagoons. It is ordinarily not found far from shore and does not run up the streams for great distances. They require but little water for spawning, and even resort for that purpose to the narrowest and shallowest creeks, sometimes not over a few feet wide, and a foot and a half deep. In their spawning places they congregate in such exceeding abundance that they are described as forming at times almost a solid mass, from which the stench produced by the dying fish is said to be intolerable. The run of the humpback extends, perhaps, through a larger period than that of any other species. In southeast Alaska it begins in June and continues

until September or even later in some places. Northward the period is somewhat shorter. On Puget Sound and southward it is more prolonged and continues until late in the fall. They are quite persistent, and, in a measure, successful in their efforts to ascend streams in which considerable falls occur. Where the water conditions—depth, width, current, etc.—are favorable a fish can probably make a vertical jump of ten feet, but to ascend a fall with that vertical height frequent attempts probably are made before success is attained, as the jumping appears to be more or less at random. It does not select a particular point on or near the lip of the falls where it proposes to strike; it simply jumps aimlessly, and sooner or later strikes the fall at a place where it is able to maintain itself and from which it can ascend into the quiet water above the falls. The humpback salmon is known to the Russians as *gorbuscha* and to the trade as pink salmon. The flesh of this species is of a very light pinkish color and much softer than in the sockeye and quinnat, for which reasons it is not highly regarded for canning. It deteriorates rapidly, especially when caught in large quantities and heaped in scows from the traps or seines. Those in the lower layers, especially, soon become damaged and misshapen and lose their scales, greatly detracting from their appearance. Nevertheless, the humpbacks are considered by many as having excellent food qualities when taken in the salt water, particularly during the early part of the run. They rank high as salted fish, and salted humpback bellies are esteemed a great delicacy.

The dog or chum salmon, *O. keta*, is a species of wide distribution. On the American coast it occurs from San Francisco northward at least to Hotham Inlet,

Kotzebue Sound, and Bering Strait. It is found also on the Asiatic coast and is the principal salmon in the Japanese waters, where it is known as "sake." It is not abundant in California, but increases in numbers northward, being most abundant in southeast Alaska. This salmon is second in size only to the chinook. It is said to weigh from twelve to fifteen pounds, although many are taken up to twenty-five pounds and individuals have been caught forty pounds and over. When it first appears along the coast it is of a dirty silver color, sprinkled with small black specks, the fins dusky, the sides with faint traces of gridiron like bars. Later in the season the male is brick red or blackish, with jaws greatly distorted. The regular run of this salmon is stated to begin in September and to continue through October and more or less of November, sometimes not ending until about December 1. It, like the humpback and silver salmon, seems generally not to ascend the rivers far above the sea, but it enters all streams large and small, going into the little creeks to spawn. In some of the smaller streams it appears in relatively very large numbers, the fish crowding together in narrow and shallow places, which become badly polluted with their dead and decaying bodies. Mr. Mowat says that they spawn principally in quiet creeks and in the shallow water along the river banks, even doing so in water so shallow as to leave part of the back exposed. As a food fish this species is inferior to all other salmon. The inferiority, however, is more marked when the fish is canned than when otherwise utilized. The flesh is soft and spongy and does not lend itself readily to canning processes. It is pale in color and therefore not so attractive in appearance as that of the other species. When utilized fresh, the

fish takes a higher rank. More and more it is being frozen and shipped east and abroad, and is meeting with much favor in that form. Considerable quantities are being dry-salted for the Japanese market.

The chinook salmon, *O. tshawytscha*, is also called king or spring salmon in Alaska; spring or chinook salmon on Fraser River and Puget Sound; chinook, royal chinook, quinnat, or Columbia River salmon on the Columbia River, and Sacramento salmon in California. Where the chinook jargon is spoken it is the "tyes," which means king. Among the Russians it is called "tchavitche or tshawytscha." It is not only superior in food qualities, but attains a vastly larger size, has a wider geographical range and a greater commercial value than any of the others. When fresh from the ocean it is a very handsome, resplendent, well-formed fish, greatly resembling the Atlantic salmon, *salmo salar*, although its form is less symmetrical and its outlines less graceful. In size no other salmon in the world compares with it. In the Yukon River it reaches a weight of over one hundred pounds, and in the Columbia River there are well authenticated cases of its having weighed more than eighty pounds. Farther south, it runs smaller, although in the Sacramento individuals weighing fifty to sixty pounds are not rare. Twenty-two pounds is a fair average weight in the Columbia and sixteen pounds in the Sacramento. This salmon occurs on both coasts of the Pacific from Monterey Bay to the Arctic Ocean, ascending all the large streams. In the Sacramento and Columbia rivers it is the principal salmon, far outnumbering all of the other species. It occurs in some numbers in other streams of Oregon and Washington, and is not uncommon in Puget Sound. It runs somewhat sparingly in the

larger streams of British Columbia and southeast Alaska, particularly the Fraser, Skeena, Nass, Stikine, and Taku rivers. They commence schooling and running as early as February. On the upper part of the Washington coast the first run occurs in that month, following the herring, upon which they largely feed. A second run is said to begin the latter part of April and to continue during May and June, small numbers also passing Point Roberts during the remainder of the summer, when they are taken in traps set for the sockeye. The fall run starts in the latter part of September and ends sometimes in October. They distribute themselves quite generally throughout the Fraser River system and ascend its different branches as far as conditions permit. The earlier or spring runs travel farthest, some of them travelling a thousand miles or more. The fall fish, it is said, spawn in the lower tributaries, one of which is Pitt River, only about fifty miles above New Westminster, and another, Harrison River, somewhat higher up. The principal river in southeast Alaska into which they run to spawn is the Taku. The spawning act extends over several days, the eggs being deposited upon beds of fine gravel in clear, cold mountain streams. Soon after they have done spawning, both males and females die, each individual spawning only once. When they first come from the ocean, the sexes are almost identical in appearance, but as the time for spawning approaches a difference is noticed between the males and the females, which during the spawning season becomes more marked. The fully developed ova of the females gives her a round, plump appearance, while the male grows very thin. His head flattens, the upper jaw curves like a hook over the lower, the eyes become sunken;

large, powerful, white, dog-like teeth appear on both jaws, and he acquires a gaunt and savage appearance. The great reserve of flesh and blood which they bring with them from the ocean enables them to keep the vital organs active until their mission up the fresh-water streams is accomplished.

The silver or coho salmon, *O. kisutch*, is known by other vernacular names, some of which are hoopid salmon, kisutch, showitz, quinsutch, and birlaya ryba. It ranks next in importance after the sockeye and quinnat. It is silvery in spring, greenish on the upper parts, where there are a few faint black spots. In the fall, the males are mostly of a dirty red color. This species is considered the handsomest of the salmon tribe, and in the salt water has game quantities in common only with the quinnat. It reaches a maximum weight of about thirty pounds, the average being about eight pounds, and an average length of about twenty-seven inches. The color of the flesh, though much lighter than the sockeye, is as deep as in the quinnat, but it fades to such an extent in cooking as to make it less desirable for canning than either of the former species. The flesh is also drier or less oily, but of excellent quality for the table when fresh, and packs nicely. The Indians prefer it to the sockeye for their own use, probably because it is more readily cured by their process of drying. They are described as active rovers in the salt water and their habit of leaping makes them readily distinguishable at the surface. They occur in large bodies and also thinly scattered over extensive areas, being erratic in their movements and often changing their positions rapidly. They are found as far south as Monterey Bay, where they appear during the month of July. From Eel River, in California,

southeast Alaska, and as far north at least as Karluk, they are found in the coastal streams. They also occur in Bristol Bay and probably in the Yukon, and are common in Japan. They usually appear in July and run as late as November, the time of appearance and disappearance varying somewhat in different sections. They tarry but a short time about the mouths of the streams they are to enter, and are wary of nets, which makes them rather unprofitable to fish for when they are running during the latter part of the season.

The blueback, red, or sockeye salmon, *O. nerka*, in the Columbia River is called the bludback, in the Fraser the sockeye, sawkeye, or sau-qui, in Alaska the red salmon or red fish and by the Russians, the Urasnaya ryba. It is the neatest and most symmetrical of the salmon. In the sea, or when fresh run, it is clear blue on the back and upper parts of the sides, shading to a clean silvery white below and on the belly. Soon after entering the river for the purpose of spawning, the color of the head changes to a rich olive, the back and sides to crimson and finally to a dark blood red, richest in the males, and the belly a dirty white. Some of the scales become dark edged and the middle of the sides show the darkest red, but unevenly. At the same time the flesh becomes spongy, the scales embedded, the back somewhat humped, and the jaws hooked and otherwise distorted. The maximum weight is about twelve pounds, and length three feet, with the average weight about five pounds, varying greatly, however, in different localities. This species is of very wide distribution. On the American coast its range extends from southern Oregon to Bering Sea. The Columbia is the most southern river in which they are known to run in any numbers. In the streams tri-

butary to Puget Sound the only ones in which they are known to run are the Lake Washington system of lakes, the Skagit and possibly, the Snohomish, Stillaquamish, and Nooksak rivers. The Fraser River is said to be the greatest of all the bludback or sockeye streams. Going northward from the Fraser several streams are found in which they run in considerable numbers, the principal of these being the Skeena, Rivers Inlet, Nass, Lowe Inlet, Dean Channel, Namu Harbor, Bella Coola, Smith Inlet, Alert Bay, and Alberni Canal. It is by far the most abundant and most important salmon in Alaska and runs in great numbers in all suitable streams. On the Asiatic side they are known to occur at Bering Island and in all suitable streams south to Japan. A peculiar trait of this species is that it rarely or never ascends a stream that has not one or more lakes at its head waters. Its spawning beds are invariably in small streams tributary to lakes, or, rarely, in the lakes themselves. The origin of this peculiar habit is not known.

Professors Jordan and Everman carefully observed the spawning habits of these salmon during two entire seasons from the time the fish arrived in July until the end of September by which time they all had disappeared. They say: "A number of important questions were settled by these investigations. In the first place, it was found that all of these fish arrived upon the spawning-beds in perfect physical condition so far as external appearances indicated, no sores, bruises, or other mutilations showing on any of more than four thousand fish examined. During the spawning, however, the majority become more or less injured by rubbing against the gravel of the spawning-beds or by fighting with one another. Soon after spawning every one of

these fish died. There was no tendency to run down stream, but they all died on or near their spawning-beds. The dying is not due to the injuries the fish receive while on the spawning-grounds; many were seen dying which showed no external or other injuries whatever." Next to the chinook salmon, the bludback or sockeye salmon is the most abundant in the waters of the North Pacific coast. In Alaska commercially it is by far the most valuable salmon. For instance, in 1906, the total catch was 19,536,761 fish, representing 1,540,856 cases, valued at \$5,720,291. The total number of salmon of all species handled in that year was 31,756,335, representing 2,341,587 cases, valued at \$8,152,655. From these figures it is seen that the blue-back or sockeye salmon constituted more than sixty-one percent of the catch, sixty-five percent of the pack, and seventy percent of the value.

Another anadromous salmoid fish found in the waters of the Pacific coast, popularly but erroneously regarded as a salmon, is the steelhead, *salmo gairdneri*, known also as hardhead, winter salmon, square-tailed trout, and salmon trout. It resembles in form, size, and general appearance the salmon of the Atlantic coast, and is distinguished from other Pacific coast salmon by its square tail, small head, round snout, comparatively slender form, light-colored flesh, and its habit of spawning in the spring. Its average weight in Alaska is about eighteen pounds, although it sometimes reaches thirty pounds; the average length is about thirty-five inches. Its range is very extended, reaching from Santa Barbara on the southern coast of California to the Alaska Peninsula, and perhaps to the Arctic Ocean. It is found in almost all the streams of the Pacific states which empty into the ocean. It

is believed to winter in the lakes and to descend to the ocean soon after the streams open in the spring. Unlike the Pacific salmon the steelhead does not die after once spawning, although some individuals probably do. Except during a period following the spawning season, the steelhead ranks as one of the very best of food fishes.

The eulachon or candle fish, genus *thaleichthys*, species *pacificus*, is found from Oregon northward. It was recorded by Doctor Bean in 1882, from Stikine River, Wrangell, Sitka, Chilkat River, and Katmai, and by Doctor Gilbert in 1895, near the mouth of the Nushagak River. It ascends the Columbia and other rivers and inlets of the Pacific coast in the spring in enormous numbers, and is considered as a fish of much economical value. Washington Irving in *Astoria* says: "Towards spring, however, the fishing season commenced – the season of plenty on the Columbia. About the beginning of February, a small kind of fish, about six inches long, called by the natives the uthlecan, and resembling the smelt, made its appearance at the mouth of the river. It is said to be of delicious flavor, and so fat as to burn like a candle, for which it is often used by the natives. It enters the river in immense shoals, like solid columns, often extending to the depth of five or more feet, and is scooped up by the natives with small nets at the end of poles. In this way they will soon fill a canoe, or form a great heap upon the river banks. These fish constitute a principal article of their food; the women drying them and stringing them on cords." Sir George Simpson in his account of an *Overland Journey Round the World*, says: "Along the whole coast the savages generally live well. They have both shell fish and other fish in great variety,

with berries, seaweed, and venison. Of the finny race, salmon is the best and most abundant, while at certain seasons, the ullachon, very closely resembling the sardine in richness and delicacy, is taken with great care in some localities. The fish yields an extraordinary quantity of very fine oil, which being highly prized by the natives, is a great article of trade with the Indians of the interior, and also of such parts of the coast as do not furnish the luxury in question. The oil is used as a sauce at all of their meals – if supping at any hour of the day and night can be called a meal – with fish with seaweed, with berries, with roots, with venison, etc. Nor is it less available for the toilet than for culinary purposes. It is made to supply the want of soap and water, smearing the face or any other part of the body that is deemed worthy of ablution, which when well scrubbed with a mop of sedge, looks as clean as possible. In addition to this essential business of purifying and polishing, the oil of the ullachon does duty as bear's grease for the hair; and some of the young damsels, when fresh from their unctuous labors, must be admitted to shine considerably in society." Eulachan oil, properly refined, may become of commercial value, there being practically no limit to its use. Experiments have been made with it by bottling and canning, it is said, with success. If the fish could be preserved for export so as to retain their flavor and body, they would undoubtedly command a sale co-extensive with sardines. The oil from the fish possess distinct medicinal properties, and in this respect is not unlike cod-liver oil. Some years ago a large pharmaceutical concern endeavored to exploit it but with indifferent success.

The Pacific smelt, *osmerus thaleichthys*, and the surf

smelt, *hypomesus pretiosus*, are both plentiful in the waters of the North Pacific coast from California to Alaska. The former measures only about six inches in length and is a feeble species. Its flesh is soft and does not keep well but it is of excellent flavor. It is not regarded of much importance for food. The latter grows to a length of about a foot, becomes very fat, and is greatly esteemed as being scarcely inferior to the eulachon.

The family of blackfish, *dalliidæ*, contains but one species, the Alaskan blackfish, *pectoralis*. It was first described by Doctor Bean in 1880, from specimens collected by its discoverer, Doctor Dall at St. Michael. According to Turner this species is probably the most abundant of all the fishes which occur in the fresh and brackish waters of the northern part of Alaska. It is found in all the small streams of the low grounds, in the wet morasses and sphagnum-covered areas, which are soaked with water and which at times seem to contain water sufficient only to moisten the skin of the fish. In the low grounds or tundras there are countless thousands of small ponds of very slight depth, connected with each other by small streams of variable width. The narrow outlets of the ponds are at certain seasons so full of these fish that they completely block them up. The soft, yielding sphagnum moss is pushed aside and under it these fish find a convenient retreat. Here they are partially protected from the great cold of the winter by the covering of moss and grass. In such situations they collect in such quantities that figures fail to express an adequate idea of their numbers. They are measured by the yard. The moss is deep according to the nature of the retreat. The natives repair to the places which are known to be

the refuge of these fish and set small traps. They remove the traps every day or two to relieve the pressure on them and to supply their own wants and those of their dogs. From May to December, tons and tons of these fish are thus removed. They form the principal food of the natives living between the Yukon Delta and the Kuskokwim River and as far interior as the base of the higher hills. North of the Yukon Delta they are also abundant. When taken from the traps, the fish are immediately put into baskets and taken to the villages, where the baskets are placed on stages out of the way of the dogs. The mass of fish in each basket is frozen in a few minutes and when required for use have to be chopped out with an ax or beaten with a club so as to divide them into pieces of sufficient size for the dogs. The vitality of these fish is astonishing. They will remain in these grass baskets for weeks and when thawed out will be as lively as ever. The pieces which are thrown to the ravenous dogs are eagerly swallowed. The animal heat of the dog's stomach thaws the fish out and its movements soon cause the dog to vomit it up alive. This fish feeds largely upon small plants, worms, and crustaceans, which frequent the ponds and low grounds. They are exceedingly fat and a good quality of oil is obtained from them. They are about eight inches in length.

I do not find the common or striped mullet, *mugil cephalus*, listed by the Commissioner of Fisheries in *The Fishes of Alaska*. Professors Jordan and Everman say that it is found "on our Pacific coast from Monterey to Chile;" that "it goes in great schools and is everywhere abundant in bays, lagoons, and all sheltered water," and that it "is a bottom-feeder and prefers still, shoal water with grassy and sandy or muddy bottom.

It swims along the bottom, head down, now and then taking a mouthful of mud, which is partially culled over in the mouth, the microscopic particles of animal or vegetable matter retained, and the refuse expelled. When one fish finds a spot rich in the desired food, its companions immediately flock around in a manner reminding one of barn-yard fowls feeding from a dish." The mullet is a food-fish of much importance.

The surf-fishes, *embiotocidæ*, are all fishes of the Pacific coast. Some of them are not oviparous but viviparous. Their viviparity was first discovered by Doctor Gibbons in 1854. The family contains seven known genera with about twenty species. In *The Fishes of Alaska* only the white surf-fish, *cymatogaster aggregatus*, and the white viviparous perch, *damalichthys agryrosomus*, are described by United States Commissioner Roberts. In this connection an account will be taken of the first named only. This interesting fish occurs from Todos Santos Bay, Lower California, northward at least as far as Yes Bay, Alaska. A large number of examples of this species were examined by George M. Bowers, United States Fish Commissioner, for the purpose of determining the extreme and average size of adult males and females, the number and size of the young at the time of liberation, and the position of the young in the ovary. It was found that the average total length of one hundred and six females examined was five and a quarter inches, and of forty-four males three and eighty-four one hundredth inches. The number of young in eighty-one females examined varied from eighty to thirty-six. The position of the young in the ovary was determined in fifty-four fishes. They were found to contain a total of eight hundred and thirteen young, eighty percent of which were lying

with the head toward the head of the mother while twenty percent had the head toward the tail. The young were quite uniformly one to one and a quarter inches long. He found that during the spawning season in June and July the fish swarmed in great numbers in the surf or shallow water along sandy shores, and that surf-fish was "a very appropriate name for this little species." The specimens collected up to July 1, were mature, the females all being heavy with young. In some instances the young had begun to escape, as some were found in the water. Frequently they were able to maintain themselves in an upright position in the water and swim about. The number of females seems to be in excess of the males, and they are much larger. They feed chiefly upon small crustaceans and other invertebrates. They are said to be a very fair pan fish.

The rockfish family, *scorpaenidæ*, has in it about thirty genera and two hundred and fifty species. The genus *sebastodes* is the largest in the family, containing about fifty-six species, all occurring on the Pacific coast from Lower California to Alaska. Twenty-one of these are described in *The Fishes of Alaska*. Some of these are viviparous, producing their young when about one fourth of an inch long. Some of these are very plentiful in Puget Sound and are of excellent food quality, and during the winter are among the principal fishes sold in the local markets. The red rock cod or red rockfish, *S. ruberrimus*, the only species here mentioned, is the largest of this species, reaching a length of two and a half feet. Specimens of it have been taken as far north as the Gulf of Alaska, and Kygania Strait.

The family *hexagrammidæ*, known as the greenlings, occurs in the North Pacific, chiefly among the Aleutian

Islands. It was first described by Pallas in 1810 from specimens obtained at Unalaska. The center of its abundance seem to be in the passages about the islands of Atka and Attu. It is known also from the Pribilof Islands and eastward through the Aleutian chain to Belkofski and the Shumagin. The most interesting species of the family is the Atka mackerel, or Atka-fish, *pleurogrammus monopterygius*. Its centers of abundance seem to be in the passages about the islands of Atka and Attu. It is usually found in kelp, three to forty fathoms in spring and early summer, retiring to deeper water later. The best account that I have seen of its habits is that given by Turner, who visited Unalaska in 1878. From it the following facts are gleaned. They make their appearance in the narrow pass between the islands of Atka and Amlia about the first of June and invariably come from the Pacific Ocean, which here mingles its waters with that of the Bering Sea. The first arrivals are males of the largest size and beauty of color. They arrive a few days before and await the arrival of the females and immature males. By the middle of June, these have come by countless thousands. They arrange themselves with their heads towards the tide current which rushes violently through the pass. The flood tide sets in from the Pacific while the ebb flows reversely, or, in other words, a southwesterly directed current for the ebb and a northwesterly directed current for the flood tide. The pass is very rocky with numerous sunken rocks in the middle and eastern side. The western side of the pass has the deeper water, it being three fathoms deep in the channel. On the north side of the pass numerous ledges of rocks, hidden rocks, kelp patches, and some islets a few feet above the water's edge are

to be found. On a cloudy day with a clear, lower atmosphere, the fish may be seen among the kelp patches in the following order: the younger males and immature females form a stratum of four to five feet deep and several feet wide; beneath these a second stratum of older males and females whose roes are not yet developed and will later in the spawning season take their places with those in the third stratum which is composed of vigorous males and females, the latter of which are the most abundant. The females deposit their eggs on the kelp. The males and females remain in this place until the spawning season is over – generally by July 20 – after which they gradually disperse and quickly find their way back to the Pacific. The Atka mackerel is one of the most handsome of the fish found among the Aleutian Islands. It reaches a length of eighteen inches and a weight of three to four pounds. The average weight of five hundred and eighty-five taken was about two and one half pounds and the maximum three and one half pounds. As a fresh fish it is delicious either baked or fried.

The cultus cod, *ophiodon elongatus*, known also as the blue cod or buffalo cod, occurs on the Pacific coast from Santa Barbara northward to Prince William Sound, and is abundant throughout most of its ranges. It reaches a length of nearly four feet and a weight of thirty to forty pounds. Although not a high-grade fish, its size and abundance makes it a species of commercial importance.

The Alaska codfish, *gadus macrocephalus*, is recognized as of kin to the common Atlantic codfish, *gadus callarias*. It is found in the Pacific from off the shores of Oregon northward to Bering Sea, where it is very abundant. Authorities differ as to its quality, some

claiming that it is not so fine a food as the Atlantic species, while others maintain that it is equal in every respect. It is not a large fish, its average weight being about eight pounds, with a length ranging from twenty-five to thirty-five inches. Its Atlantic relative reaches a much larger size. The Gloucester *Times* of February 1, 1907, records the capture by Mr. Thomas Jesso at Little Brass d'or (Cape Breton) of a codfish six feet four inches long, weighing one hundred and forty-two pounds. The discovery of the Pacific or Alaska cod was made in 1857, by Captain Mathew Turner, of the brig *Trinandra*, who was detained by ice for three weeks in Castor Bay, at the head of the Gulf of Tartary, while en route from San Francisco to Nicolaevsk, on the Amoor River. During their enforced idleness, the crew of the *Trinandra* amused themselves at fishing, and to their surprise caught plenty of cod, averaging two feet in length; but it was not till 1863 that Captain Turner turned the knowledge of his discovery to account. In that year he outfitted a schooner for the business and made a successful trip, securing a full cargo on the Siberian coast, which was disposed of in San Francisco. His success encouraged others to try cod fishing, and the result was the discovery of an abundance of the fish in the deep water all along the North Pacific coast, from California to Bering Sea. A difficulty which stood in the way of establishing cod fishing on an extensive scale on the Pacific coast was the moist climate, which prevented the curing of the fish in the open air. Formerly this was held to be a fatal obstacle, but mechanical dryers have now been invented, which are claimed to cure the fish faster, more thoroughly, and cheaper than the old sun and air process.

The flat fish family, *pleuronectidæ*, differs in some important respects not only from all other fishes, but from all other vertebrated animals. They lie flat near to the bottom of the sea, the upper surface in most species being of a dark color, while the lower surface is white. This is an instance of what is known among naturalists as protective coloration. They have no air bladder, and have little power of rising in the water. When they are disturbed they assume a vertical position, showing their white sides, and dart along with great rapidity. They also differ from all other vertebrates in a lack of perfect symmetry in relation to the two halves of the body. The two eyes are on one side, and are irregularly placed; in some species they are on the right side, and in others on the left. There is also an irregularity of the bones of the head, while in all other vertebrates they are alike on both sides. Then there is the difference in color. There is also a difference in the pectoral fins, one being longer than the other. They abound chiefly where the bottom is sandy or muddy and is smooth. They are found in all oceans, some of them living in brackish waters and even entering rivers. Some species grow to an enormous size. They are an important food fish. The family is divided into three tribes or sub-families, namely: (1) the halibuts, *hippoglossidæ*, having a large, symmetrical mouth and symmetrical ventral fins: (2) the flounders, *pleuronectidæ*, with a small unsymmetrical mouth and symmetrical ventral fins; and (3), the turbot, *lophopsetta*, having large mouths and the ventral fins unsymmetrical. All of these are carnivorous, feeding on shrimps, crabs, small fish, and some of them on carrion. Several of the species are food fishes of the Pacific waters even to the Arctic coast. Notable among

them are (1) the common halibut, *hippoglossus hippoglossus*; (2) the Alaska dab, *limanda aspera*, and, (3) the great or starry flounder, *platichthys stellatus*.

The common halibut in the Pacific ranges from San Francisco north to Bering Straits. A very large bank is found in the mouth of the Straits of Fuca. According to Doctor Bean its center of abundance is in the Gulf of Alaska, particularly about Kodiak and the Shumagin islands. This halibut is one of the largest of fishes. One taken at the head of Karta Bay measured seventy inches in length and weighed one hundred and fifty pounds. In its stomach were found *Cancer antennarius*, fragments of clam shells, backbone of a fish and a large stone with partly digested barnacles on it. One taken in Dundas Bay was sixty inches long and weighed one hundred and twenty pounds. One taken at Killisnoo was fifty-five inches long and weighed seventy-five pounds, and had six large crabs in its stomach. Mr. John M. Cobb reports having seen and helped to weigh one at Juneau that weighed three hundred and sixty-five pounds. Nilsson records one from the coast of Sweden that weighed seven hundred and fifty pounds. The average size and that most esteemed for food is about sixty pounds. In September, 1914, the steamship Admiral Watson on which I was voyaging to Cook Inlet, was detained at Juneau for four days for repairs, during which time the boat crew amused themselves by fishing for halibut from the lower deck. We were served with fresh halibut during our stay and I can testify that it was very good to eat.

The Alaska dab is a species of the North Pacific and Bering Sea, and is found on both coasts. It is found as far south as Vancouver Island. Doctor Bean, in

1882, reported it from Sitka, St. Paul, Kodiak Island, Humboldt Harbor, and the Shumagin Islands. Doctor Gilbert, in 1895, took them at Herenden Bay and in abundance at twenty-four stations in Bristol Bay. In length they vary from one and a half to fifteen inches, and are regarded as an excellent food-fish.

The great or starry flounder is the only species of the genus *platichghys*. It occurs from middle California to the Arctic Ocean. Apparently it is the most abundant and widely distributed flounder in Alaska. Frequently many large examples of it are taken in salmon traps. Forty-one examples of it taken at various places along the coast from Cape Flattery northward to the Alaska peninsula and across to Kamchatka, ranged in length from five-tenths to eleven and a quarter inches. It reaches a weight of fifteen to twenty pounds. It lives in shallow water and sometimes ascends the larger rivers.

The present status of halibut fishing in the Pacific has been the result of rapid growth dating back to 1888, when it received its principal stimulus through the advent of two Gloucester vessels which began fishing on Flattery Bank and in the adjacent region. Port Townsend was the first headquarters of the industry. During those earlier years of the industry larger vessels ventured as far north as Cape Scott and the Queen Charlotte Islands, and very important grounds were found in Dixon Entrance. Although the work of those vessels was not long continued, it gave evidence of abundant resources and led to the opening of markets even as far distant as Boston and Gloucester on the eastern coast, where the western product came directly into competition with that from the great Atlantic fishing grounds. Since then the

main outlet for the Pacific catch has been furnished by the eastern markets, and controlled by the large eastern dealers, the shipments being mainly made at seasons when the Atlantic catch was smallest.

Among invertebrates the Pacific coast region is very rich in edible mollusks and crustaceans. Of these are the crabs, shrimps, prawns, oysters, mussels, cockles, holothurians, chitons, octopi, and sea urchins. Large crabs belonging to the genus *cancer* are abundant from Puget Sound and the Straits of Juan de Fuca to south-east Alaska and Prince William Sound in central Alaska, and recent information is to the effect that edible crabs of a fine variety are caught around King Island in Bering Strait. They are in great demand for food, taking the place of the lobster, which is not found in the Pacific. In an earlier chapter we gave an account of the crab industry at Anacortes on Puget Sound. In 1909, one of the dealers, whose sales had been considerably curtailed owing to the inadequacy of the supply from Puget Sound and the close season which prevails in that locality part of the year, visited Wrangell, Ketchikan, and Juneau, and interested the local dealers and fishermen in the business to such an extent that several of them took it up. The crab pots used at those points are of varying sizes and shapes. The most commonly used is a rectangular pot of wooden framework, about ten inches long, eighteen inches high, and thirty inches wide, with three and a half inch stretch mesh net covering. The tunnels, of which there is one at each end, are seven inches in width and five inches in height. The pots are set on trawls, about twenty-five or thirty to a trawl. The trawls are marked by buoys and held by anchors. All sorts of fish, clams, etc., are used for bait. Crabs from six inches up in size

are utilized for shipping from these points. The shippers classify them by weight and size as follows: medium average, one and a half pounds; large average, two and a half pounds; large, two and a half to three and a half pounds. The crabs are measured the broad way of the back. They are packed in wooden boxes holding about fifteen and a half dozen. At first all were shipped alive, packed in seaweed, but so many died on the way or arrived in bad condition that finally all were boiled before being shipped.

Shrimps and prawns are regarded as great delicacies. The habits of these creatures are such as to place them generally outside the ordinary range of observation, so that fishermen may be scarcely aware of their presence, when an active search might disclose them in abundance. Shrimps have been found in a number of places from Puget Sound northward to Bering Sea. At times they are fairly abundant in the vicinity of Wrangell and in Lynn Canal. At Wrangell preparations have been made for the catching and shipping of them to Puget Sound ports, where they command high prices.

The small, native oysters, *ostrea lurida*, are found in considerable quantities at many places in the waters of the Pacific coast. A native rock oyster has been reported from Sitka, Peril Straits, and the Skookum Chuck on the west side of Prince of Wales Island, in southeast Alaska, and Latouche Island in Prince William Sound, in central Alaska. On Puget Sound, the cultivation of the native oyster has received attention, and several companies are in successful operation. Olympia, Washington, has become the center of the oyster industry, and the Olympian oyster is esteemed everywhere on the coast. Several firms have imported

Atlantic seed oysters and in many instances these plantations have produced good results.

Mussels are plentiful in many places, especially along the Aleutian chain and in southeast Alaska, where they form an occasional addition to the native's larder. About the year 1900 some were taken from the neighborhood of Unalaska and planted around St. Paul and St. George islands, of the Pribilof group, where they have thrived and are now found in abundance. The few whites living on the islands eat them after steaming them in the shell, and report them delicious.

Beds of scallops and cockles, are abundant from Puget Sound northward to Dry Strait near Wrangell, and are more or less sought for food, and although such "small deer" in the sea are barely reckoned in estimating the commercial importance of the coast fisheries, they in the aggregate contribute a very considerable amount to the annual value of the industry. The scallops are distinguished by the regular ribs of the shells and by the two angular projections that widen the sides of the hinge. They have a small foot, and some species have a byssus. In some the shell is beautifully colored. The foot of the cockles is used mostly for burrowing in the sand or mud.

Bech-de-mer, or trepang, is quite plentiful in the North Pacific, but it is not sought as a commercial commodity. Chinese and Japanese fishermen collect it in small quantities for their own use, but incidentally to their regular business. Bech-de-mer, *Holothuria edulis*, is also known as sea-slug, sea-cucumber, sea-pudding. It is highly esteemed for food in China, where it is imported in large quantities. The animal is repulsive, resembling a big flat worm from six to

twenty-four inches in length, and is prepared for use by boiling and drying over a wood fire, or in the sun.

Chiton, *Katherina tunicata*, known locally as the "Gumboot," is found in southeast Alaska where it is gathered and eaten by the natives. The sea urchin is very abundant along the Aleutian chain and large numbers are consumed by the natives. Octopi are abundant in many sections and are eaten by the natives. A few of the crab fishermen of Wrangell engage in the business of catching them with spear and hook and line baited with fish heads and clams. They bring from six to fourteen cents per pound in the Seattle market.

Skowl Arm, New Metlakatla, Ketchikan, and Wrangell

On the morning of August 17, Vancouver's vessels quitted Salmon Cove. Sailing down Portland Inlet, they reached Chatham Sound and proceeded up the coast through Moira Sound and, on the morning of the 21st, passed the entrance of another sound, which in extending to the southward divided into branches; this Vancouver called Cholmondeley's Sound. Noon brought them to latitude $55^{\circ} 22'$, longitude $228^{\circ} 21'$. In this situation they had a more distinct view of the two great branches of Clarence Strait than they had before obtained; (Behm Canal) that leading northeast, being the same they had passed through in the boats, they were in some measure acquainted with, but the other (Clarence Strait) stretching to the northwest, appeared to be of greater extent and seemed to be the main branch of the inlet. On reference to Señor Caamano's chart, a very distant land on its northeastern shore appeared to be that to which he had given his own name.

Cholmondeley Sound is a deep inlet entering into Prince of Wales Island. Its extreme length is about sixteen miles; it has several arms, all of which are deep and bold and generally free from dangers. From the head of the western arm there is a planked road, three and a half miles long to the head of Hetta Inlet. Chomly (Sunny Point) is a village with a fish-saltery and wharf on the north side of the head of the main

sound, nine miles inside Chasina Anchorage. Skowl Arm is about twelve miles long, and the head of it is only about two miles from the head of Cholmondeley Sound; the intervening land is high. The eastern point at the entrance to this arm is known as Skowl Point. This arm and point were named after Skowl, "an old Indian Chief of the Eagle Clan whose sway was questioned by none. He was the greatest chief of his time, and ruled his people as autocratically as the lordly, but blustering Baranoff ruled his at Sitka. Skowl repulsed the advances of the missionaries and scorned all attempts at christianizing himself and his tribe. His was a powerful personality which is still mentioned with respect not unmixed with awe. To say that a chief is as fearless as Skowl is a fine compliment and one not often bestowed."

On the north side, three and a half miles up Skowl Arm is the abandoned Haida village, the former home of Chief Skowl. In front of the village is a beautiful gravel ledge which covers with water one hour before high water; it extends about one hundred yards from the shore. I visited this village August 22, 1913, on the steamship Spokane, which made an excursion that year through waters of the North Pacific under the command of Captain Hunter. A thing that added much to the interest and success of this voyage was the presence of Mrs. Mary E. Hart, a woman well versed in Alaska and Alaska affairs and with the Inside Passage. For eight years during the summer time she had traveled as a lecturer on the Spokane and every evening delivered to the passengers a lecture descriptive of Alaska and what they would probably see en route the next day. Her lectures were very instructive and interesting and added much zest to the cruise. The

evening before reaching the Kassan village, she told us all about Chief Skowl and his abandoned village. Among other things, she said that we would find the village overgrown with devil's club and nettles, the sting of both of which were very painful and poisonous and that the planks of the board-way and steps leading into the abandoned buildings were rotten and dangerous. She also told us that curio hunters had stolen from the abandoned buildings almost everything that had been left in them and admonished us not to commit further depredations.

I was the first person to leave our vessel and go ashore. The first thing that attracted my attention was the large number of quaint old totem poles yet standing in front of the buildings – especially those in front of the residence of Chief Skowl, which I entered and examined with care. It was perhaps sixty feet square, built of massive logs and covered with split slabs of timber. The inside, excepting the entrance, was surrounded by two platforms, one above the other, and both constructed of rough boards. The top one was deep enough to accommodate a full-grown person in a reclining position and had been used for storage and sleeping purposes. The second was wider than the other and had been used as a general family room. Two and a half feet below this was an open space twenty-four by twenty-seven feet in size. In the middle of this was a fireplace and in the roof over it an open space for the smoke to escape. The roof was supported by four immense upright logs, one in each corner and sculptured with totemic designs. It was indeed a quaint, old structure. A lady tourist in looking about the building found a game bag that had been left by the Indians. Respecting what Mrs. Hart

had said, she declined to carry it away, and thinking that I could use it in connection with the writing of this article, I appropriated it, brought it home with me, and still have it as a curio. In leaving the building I stepped on a rotten plank and fell backward, hips downward, into a hole with my feet and arms upward, in a helpless condition. Two ladies came to my rescue but were unable to assist me and called for additional help. A Mr. A. P. Miller of Milwaukee and Mr. C. L. Stewart of Los Angeles responded and pulled me out. I was frightfully stung by devil's clubs and nettles, and suffered with the sting for full twenty-four hours. As I had been admonished as to what might happen, this episode greatly chagrined me. The Indian graveyard adjoined the village and showed the great attention and care with which the Indians disposed of their dead. The inscriptions showed that recent burials had been made here. On one of them the inscription read, "Wm. Sanheit died July 1, 1900, aged 51 years." The graves are marked with all kinds of designs, including many totems. The most pretentious of these is the Bear grave totem.

As Vancouver was returning from his examination of Behm Canal and was passing Gravina Island, he observed that the eastern shore of Gravina Island "took a direction S. 30 E. for four miles, and then turned short to the eastward and northeast, appearing to divide the island of Gravina by a passage about two miles wide." This is a correct description of the approach from Clarence Strait to Nichols Passage, which, as Vancouver conjectured, divides Gravina Island, as it then was known, into two parts, now known as Gravina and Annette islands. Vancouver did not pass through it and gives no account of it.

Nichols Passage extends from Clarence Strait to the eastern end of Tongass Narrows and offers the most direct route for vessels from the southern end of Clarence Strait to Ketchikan. I have voyaged through it many times. There are several clusters of dangerous rocks in the passage, which are easily avoided in daylight and clear weather. There is a good channel on either side of Kelp Rocks. Dall Head, the southeastern end of Gravina Island, is the western entrance to the Passage; it is a low, wooded point rising rapidly back to the high mountains of the Dall Ridge, which, with its high peaks of nearly three thousand feet, forms a conspicuous landmark from Clarence Strait and Dixon Entrance. Dall Head and Dall Ridge were, as I understand it, named in honor of William H. Dall, a distinguished Alaska explorer and author of *Alaska and its Resources*; his book has been a reliable source of information in the preparation of mine.

Annette Island is located between latitude 55° and 56° and longitude $131^{\circ} 20'$ and $38'$, and extends in a north and south direction. It is bounded on the south by Tongass Harbor and Felice Strait, on the east and northeast by Felice Strait and Revilla Gigado Channel, and on the west by Nichols Passage. It is mountainous and well wooded. Port Chester is an extensive bay, with numerous inlets and rocks indenting the western shore of the island. Metlakatla, an important Indian mission post-village is on the south side of the bay at Village Point. There is a fish cannery and saw-mill at the wharf, which has a depth of twelve feet at its end. Village Point has a sandy beach on its east side and is a good berth for beaching boats.

In an earlier chapter, I gave an account of the founding of the Metlakatla Mission, its disruption, and the

removal of the Duncan faction to Annette Island. The conclusion of the story is as follows: having determined to abandon Old Metlakatla, a delegation of the seceding Indians asked Mr. Duncan to go to Washington, and ascertain if they would be allowed to move to Alaska, and whether they would be received as citizens of the United States, and be protected in their rights. Mr. Duncan complied with their request. At Washington he was received by the representatives of the government with friendly feelings, and was assured that he and his Indians might choose for themselves a home in Alaska, but that officially nothing could at that time be done which might be construed by Great Britain as an unfriendly act to the Canadian government, or to the government of any of its provinces. Acting upon such assurances, Mr. Duncan suggested that a deputation of Indians should go at once and examine certain eligible sites for a new colony, and select the one that seemed best. This was done, and David Leask, John Tait, Edward Benson, Adam Gordon, and Fred Ridley were chosen to make the selection. They soon returned and reported that they had made their selection, and in a short time it was ratified by all. Soon pioneers were dispatched to build temporary huts near the beach, while the rest of the villagers went on their usual summer tours to gather and put up the winter supply of food.

Annette Island was set apart as a reservation for their use by act of Congress, approved March 3, 1891. It provided that the land should be held and used by these Indians in common under such rules and regulations and subject to such restrictions as might be prescribed from time to time by the Secretary of the Interior. It was not, however, until 1915, that any rules,

regulations, or restrictions as provided by law were prescribed. In the meantime, Mr. Duncan assumed complete control over them both spiritually and temporally. The powers he exercised were almost completely autocratic and he brooked no interference in such control by any authority, either constituted or otherwise. Dissatisfaction among the Indians over the control thus exercised by Mr. Duncan had been growing for many years, and the unrest reached a culmination in the fall of 1913, when a school, for which a majority of the Metlakatla Indians had petitioned the United States government, was established by the Bureau of Education. Mr. Duncan vehemently resented the establishment of this school as an invasion of his rights and denied the authority of the United States government to interfere in any way in his direction of the affairs, industrially or otherwise, of the Metlakatlans. Rules and regulations for the government of the community were formulated in February, 1915, by the Secretary of the Interior. Under these regulations a form of local government was instituted, and a town council was elected.

The arbitrary conduct of Mr. Duncan led almost to the dismemberment of the colony and the abandonment of the village. He stopped the development of the place. Like the dog in the manger, he would not do nor let others do. I was there in 1914 and was shocked by the change that had taken place. Most of the homes were surrounded by brakes and brambles. In 1917, the Interior Department leased the cannery and fishing privileges of the island to J. L. Smiley, by the terms of which he was to rebuild the cannery and have it in operation for the season of 1918; the lease for a term of four years. It was expected that at the end of this

period the revenues accruing from the contract, consisting of one cent per fish taken from the reserve by the leasee, would be sufficient to enable the Interior Department to take over the property of the leasee, after which the cannery would be run by the native co-operative company which had been organized in 1916, under the name of the Metlakatla Commercial Co.

I have visited Metlakatla, as it is now called, and conversed several times with William Duncan, the "Apostle of Alaska." He was a man of kindly heart, and was much devoted to his Indians. He helped them to help themselves, and in doing so helped himself. His estate at the time of his death amounted to more than seventy-five thousand dollars, most of which was in a bank in Seattle. This, by his will, he left in trust for the benefit of Metlakatla Indians.

Tongass Narrows extends northwestward from Mountain Point between Revilla Gigado and Gravina islands. Pennock Island lies in the east of the Narrows and is three miles long. Ketchikan, six hundred and eighty miles from Seattle, is an incorporated town and port of entry on the north side of Tongass Narrows abreast the western end of Pennock Island. It is lighted by electric lights, has a telephone system, and water is piped to its wharves. It is the distributing point for miner's supplies for that part of southeast Alaska. It has a relief station of the United States Public Health and Marine Hospital Service. From Ketchikan there is communication by small craft with points in Behm Canal, Nichols Passage, Clarence Strait south of Hadley, Howkan, the west side of Prince of Wales Island, and Sumner Strait to Wrangell. There is cable communication with the prin-

cial points in Alaska and Seattle, and by telephone with Loring. Ketchikan is an active commercial city, with a large sawmill and an extensive fish cannery with a capacity of one hundred and twenty-five thousand cases per season.

The word "ketchikan" in the Thlinget language means, as nearly as can be interpreted, "wedge in," and its significance arises from the fact that there is a small island in Tongass Narrows immediately in front of the town which has the appearance of being wedged into the narrows. This island is about a mile and a quarter in length and on the wide side about a half a mile in width. It is shaped like a wedge and has its apex directly in front of the city docks. The real nature of the wedged in idea is not fully apparent until one climbs to the top of Deer Mountain, just south of the city and about four thousand feet in height, and from there surveys the wedge so that its true shape may be seen. There it becomes plain that the native mind was right in grasping the most noticeable thing in the landscape to designate his village. The first white settler who came to Ketchikan to live temporarily was a man by the name of Snow. He erected a saltery at the mouth of Fish Creek in the year 1883. At that time there was a considerable settlement of Indians near this point. A Mr. Eschee came the next year with Snow, and then their names passed out of the history of the place. Mike Martin came about 1888; he afterwards became the first mayor of the place. About 1890 the saltery was again used by some one whose name to me is unknown. From that time white men began to come for permanent residence. The town was incorporated in the spring of 1900. The population of Ketchikan is not far from thirty-five hundred white people and per-

haps five hundred natives. The latter fluctuate greatly between the city and outlying fishing villages and camps.

When I was at Ketchikan in the summer of 1914, I called upon the editor of one of the Ketchikan newspapers and explained to him the purpose of my call. He jocularly said he hoped that I would write about something other than the Indians and icebergs of Alaska, adding that most of the Pacific coast writers had found but little else to write about. I assured him that I would give serious consideration to what he had said, and I have done so. In doing so I have tried to portray the conditions as Vancouver found them, and as they now exist; he found Indians and ice and snow-covered mountains, and these are yet found where he voyaged. Thus it will be seen that a truthful story of the present conditions must take some account of them. I have, however, as in the instance of Ketchikan, tried to do more by telling the marvelous story of the development of the land and water explored by Vancouver, more than a century and a quarter ago. If I have succeeded, the editor mentioned will give me credit for doing it, and I will be pleased and gratified with the result.

In the afternoon of August 21, Vancouver's vessels were in latitude $55^{\circ} 20'$, longitude $225^{\circ} 17'$. The weather being calm, a good opportunity was afforded to a party of natives from the western shore of Clarence Strait to pay Vancouver a visit. They approached with little hesitation, and one of them, an inferior chief, requested to be admitted on board. On this being granted, he gave Vancouver to understand that he was acquainted with most of the traders of the coast, and said that he belonged to a powerful chief

whose name was O-non-nis-toy, the U-en-smoket, U-en-Stikin, and pointed out his residence to Vancouver up Clarence Strait, the northwest branch. He asked Vancouver to fire a gun saying on the report of this the great chief would visit them with an abundance of salmon and sea otter skins to barter for their commodities. His request was complied with. He then desired to know if Vancouver intended to go up (Clarence Strait) the northwest branch, and on being answered in the affirmative he appeared to be much pleased; but on being told they would first visit (Behm Canal) that to the northeast, he not only seemed to be disappointed but received the intelligence with disapprobation. He endeavored to make Vancouver understand that in those regions he would neither meet with chiefs, skins, nor anything worthy of his research, and that the people who resided in that quarter were great thieves and very bad men. As the explorers were not more than a dozen miles at this time from Escape Point, the greatest attention was paid to the countenance and deportment of these strangers to recognize in them any of the treacherous tribe by whom they had so recently been attacked; but they did not discover a face which they had ever seen before.

Vancouver was much disposed to proceed up (Clarence Strait) the northwest branch until they should meet a convenient stopping place for the vessels, but as there was yet a probability that the unexplored openings in the western shore of Behm Canal might communicate with that branch, or possibly with the ocean further to the north, he was induced to seek an anchorage nearly midway between the points in question. For this purpose the Chatham was sent ahead, and in the evening she made the signal of having dis-

covered an eligible port on the western shore of Behm Canal, in which she shortly anchored. The Discovery, because of the falling of the wind, was compelled to anchor at eight o'clock in the evening, on the outside in fifty-four fathoms of water. This port was named by Vancouver, Port Stewart, after Mr. John Stewart, one of the mates, in compliment to his having made a very good survey of it. The communication with the shore was easy, and wood and water could be procured in abundance.

Upon the arrival of the Discovery in Port Stewart, the boats were immediately prepared for two long excursions. Mr. Whidbey in the large cutter of the Discovery and Lieutenant Baker in the launch, with supplies for a fortnight, were to proceed and finish the survey of those branches of Behm Canal which Vancouver had been obliged to abandon towards the conclusion of his last excursion, and afterwards to continue their researches along the continental shore, so long as their provisions might last, or till it led them back to Port Stewart the station of the vessels. Mr. Johnstone, with the two cutters and ten days provisions, was directed to return to Cape Caamano, for the purpose of examining the starboard shore of Clarence Strait, until he should find it communicating with the ocean. Both parties proceeded early in the morning of August 23. In the afternoon, the Indians who had attended them on the 21st visited them again, but without any additions to their party. The man to whose care Vancouver had consigned the present for his chief told him that in a day or two O-non-nis-toy would pay them a visit. He said the chief was at some distance, that it would require time to prepare for his journey, that he would appreciate a further present as a tes-

timony of his friendly intention, and that molasses, with some bread to eat with it, would be very acceptable. Accordingly, these with such other articles as Vancouver considered the occasion demanded were entrusted to his care, and he departed the next morning.

About midnight Vancouver and his party were disturbed by the singing of a party of the natives as they entered the harbor. On a nearer approach it proved that there was but one canoe and that it contained seventeen persons. They paddled around the vessels with their usual formalities and landed not far from the Discovery, where they remained singing until day-break. Their faces were painted after various fancies, and their hair was powdered with very delicate down of young sea fowls. With the same ceremony they again approached the ship, and came alongside with the greatest confidence. The chief of the party, by name Kanaut, requested permission to come on board, and this was immediately granted. He then presented Vancouver with a sea otter skin, and on proper acknowledgement being made, he asked that traffic between his people and Vancouver's might be entered into. By their conduct they proved themselves to be keen traders, but strictly honest in all their dealings. They continued in the neighborhood until August 28, when they took a most friendly leave.

In the afternoon of August 28, Mr. Whidbey and his party returned after having traced the boundaries of the continental shore from the place where Vancouver had quitted it to Port Stewart. Among other things, Mr. Whidbey reported that, on the 27th, near the head of a small inlet they came upon a party of seven natives, who seemed to be prepared to oppose their landing. Their canoes were lodged close to them, near

a miserable hut. After they had put on their war garments, they advanced to meet the boat; one of them was armed with a musket and another with a pistol; these they cocked, whilst the other five were provided with bows and plenty of arrows and had them in readiness for immediate service. An elderly person also made his appearance at a little distance; he was without any weapon, or war garment, and while he made long speeches, he held in one hand the skin of a bird, and with the other plucked out the young feathers and down, which at the conclusion of certain sentences of his speech, he blew into the air. These actions Mr. Whidbey considered as overtures of peace; accordingly he threw some spoons and other trivial articles to the orator and gave him to understand that they wanted something to eat. This had the desired effect, for this pacific individual ordered those who were armed to retire, and some salmon was soon brought. He then directed the boats to come to the rocks, where he delivered the fish and received some articles in return. He still continued to blow the down into the air, as he plucked it from the bird's skin. This custom, Mr. Whidbey had noticed before with the inhabitants of the coast.

On Saturday afternoon, August 31, Vancouver and his party were surprised by the arrival of a large canoe full of natives singing a song and keeping time by the regularity of their paddling. Their course was directed towards the Discovery. The chief of the larger canoe requested permission to be admitted into the ship, which being granted, he came on board accompanied by a man, who, though not assuming the character of a chief, appeared to be a person of no small consequence, as the chief seemed to appeal to him

on all occasions, and his countenance bespoke much penetration. After a few words and signs had passed in assurance of peace, and of good understanding between them, the minister, for in that capacity this man seemed to act, gave Vancouver to understand, that the chief who then was visiting them was the great O-non-nis-toy, and this intelligence was almost immediately confirmed by Kanaut, the messenger before mentioned, who arrived in a small canoe and was received by the tribe in other canoes with similar ceremonies. O-non-nis-toy accepted with great cheerfulness such presents as Vancouver considered it proper to make on this occasion. Towards the close of the day, this great chief, with two or three of his suite, lamented that they had no habitation on shore, and requested permission to sleep on board. This was granted, and when it was dark some fireworks were exhibited for their amusement. From Vancouver's previous acquaintance with Kanaut, he was at a loss to know in what manner to provide some refreshment for O-non-nis-toy. Bread and molasses, with rum and wine, were set before him, to which was added some of their own dried fish. On this he and his whole party seemed to regale themselves very heartily and then retired to rest with much composure. Early next morning O-non-nis-toy went on shore, where they adorned their persons, which being accomplished, he and the other chiefs came off in his large canoe, and according to their custom, sang while they paddled around the vessels. This ceremony being ended, they came alongside the *Discovery*, and exhibited a kind of entertainment that Vancouver had not before witnessed. It consisted of singing and of a display of the most rude and extravagant gestures that could be imagined. The

principal parts were performed by each in succession becoming the leader or hero of the song, at the several pauses of which Vancouver was presented by the exhibiting chief with a sea otter skin. After the chiefs had played their part, they desired to be admitted on board, O-non-nis-toy giving Vancouver to understand, that as peace and good will had been established between them, he wished that trading might be allowed. This request was granted, and several sea otter skins, a great number of salmon, and various dried articles were purchased. They entered into a brisk traffic for blue cloth, files, and tin kettles, which they preferred, next to firearms, which were refused them.

The party of Indians thus assembled numbered about sixty persons; among whom was a young man who seemed to differ materially from the rest in general deportment. He was dressed in a blue jacket and trousers, and seemed perfectly at his ease, particularly with respect to his pockets, which, to persons unacquainted with their use, generally produced embarrassment. He was very fond of cigars, which he smoked in the Spanish fashion, discharging the fumes through his nostrils, and also of snuff. Vancouver had much reason to believe that he had made free with a snuff-box that was taken from the cabin during the visit of these people. He was perfectly familiar with all of the different provisions, and ate and drank of everything that was given to him for that purpose, without the least hesitation, and with the greatest glee and appetite. His person had nothing of the European character in it, but by attentively observing his countenance, Vancouver was inclined to suppose that he was a native of New Spain, who possibly had deserted from a Spanish vessel employed in the examination of

this coast. His fondness for tobacco favored the conjecture that he was not a native, as he was the first person who had sought after this luxury. Under the impression that he had deserted from the Spaniards, Vancouver interrogated him in their language but to no effect, for he did not betray the least knowledge of the Spanish tongue. This, however, he might have artfully concealed, lest he should have been taken from his present way of life, which he undoubtedly preferred, as he declined Vancouver's offer of taking him on board the *Discovery*.

About noon of September 4, Mr. Johnstone and his party returned to Port Stewart. He reported that he had not actually discovered a passage to the ocean by the way that he had pursued, but that there was little doubt that (Clarence Strait) the channel he had navigated would ultimately be found to communicate with it. August 24, the day they quitted the vessels in Port Stewart, was employed in reaching Cape Caamano, which was effected about dark. From there they proceeded up Clarence Strait, through Ernest Sound, examined Bradfield Channel and Eastern Channel, and, on August 28, found the western shore terminated in a very conspicuous point, to which Vancouver gave the name of Point Highfield. From it, it was manifest that they had arrived at the confluence of three extensive branches. The most spacious stretched to the westward; that which they had navigated was the least, and the line of the continental shore appeared still to continue in the above direction up the third branch, whose east point of entrance Vancouver distinguished by the name of Point Rothsay. Towards this point their course was directed, but they were soon stopped by shallow water, which obliged them to quit the shores

of the continent, and to proceed along the edge of the shoal in nearly a west direction; and having traced it about a league, in six to nine feet of water, it was found to be connected with the northeast side of (Mitkof) Island, lying from Point Highfield N. 63 W. distant four miles. To the south of the shoal and in its immediate vicinity, were four small islands (one named Kadin) and two or three islets. Beside these, three small islands were lying to the north of the shoal (one of which is named Dry Island and another Farm Island) and the land in that neighborhood had the appearance of dividing the third branch into two or three arms (one of which is known as Dry Strait, and another, the eastern one, the Stikine River). The last named was the object of their pursuit, they expecting to find a passage towards it to the westward of Farm Island, which in a direction N.N.E. and S.S.W. is about two miles in length, and one mile in width. They were, however, disappointed, as they found the shoal to extend from the northwest part of the island, and to unite with the land (Mitkof Island) forming the western point of entrance into the third branch, which Vancouver called Point Blaguierre, located in latitude $56^{\circ} 39'$, longitude $227^{\circ} 40'$. The land being thus connected by the shoal near Point Rothsay, was considered to be a continuation of the continent (notwithstanding the shoal was at the mouth of the Stikine River). The depth of the water along the edge of the shoal was from two to ten fathoms at high water. Many unsuccessful attempts were made at the time to pass it, but the depth decreased too fast to venture further, and as the tide fell, patches of dry sand became visible in all directions. Again another important river was passed without its having been recognized as such.

Stikine River, thus missed by Vancouver, debouches by two mouths; one, the north channel, following the mainland westward, enters the head of Frederick Sound; the other follows the mainland southward, and forms the only navigable entrance to the river, the north channel being only navigable by boats at high water. The southern entrance has a least depth of about two feet at low water with a rise of eighteen feet at spring tides. The channel is one quarter to one half mile wide, and changes with every freshet. The river freezes in the winter, and with the spring freshets the current runs with great velocity. A small, stern-wheel steamer from Wrangell navigates the river in summer and early fall months as far as Glenora, a distance of one hundred and twenty miles; canoes can ascend another twelve miles to the mouth of Telegraph Creek. "Stikine," according to the late J. W. McKay, is derived from the Thlinget word "sta-hane" meaning a river. Although for the last five miles of its course the Stikine River runs through Alaska, it forms the main artery of communication at present for that portion of the province of British Columbia known as the Cassiar District. It rises in latitude 58° , longitude 129° , and flows west, then south into the Pacific Ocean, twelve miles north of Wrangell. Stikine Strait is the northern branch of Clarence Strait, connecting it with Sumner Strait and the waters of the mouth of the Stikine River. This strait is broad and deep and is generally used by vessels going to Wrangell Strait.

Wrangell Island is about fourteen miles long, separated from the mainland by a narrow channel or fiord. Wrangell Harbor lies on the west side of the northwest end of Wrangell Island, one mile below Point Highfield. Wrangell is a post office and port

on the east side of the harbor. A light-draft river steamer makes irregular trips up the Stikine River, and a small steamer plies to Shakan, points on the west and south sides of Prince of Wales Island, and Ketchikan. It has cable communication with the principal points in Alaska and with Seattle. Wrangell Island, harbor, and town were named in honor of Baron Ferdinand Petrovitch Wrangell, a Russian navigator, born in Esthonia about 1795. He belonged to a noble family of his native province and was appointed in 1820 to the chief command of an expedition designed to explore the Russian polar seas. After that, as chief in command, he made other explorations in the waters of Russian America. In 1825, as commander of the sloop of war *Kratkoi* he made a voyage around the world, and upon his return in 1827 was appointed governor of Russian America.

Sir George Simpson, in making his overland journey around the world during the years 1841 and 1842, visited Wrangell, then known as Fort Stikine. Concerning it he says: "The establishment of which the site had not been well selected, was situated in a peninsula hardly large enough for the necessary buildings, while the tide, by overflowing the isthmus at high water, rendered any artificial extension of the premises almost impracticable; and the slime, that was periodically deposited by the receding sea, was aided by the putridity and filth of the native villages in the neighborhood in offending the atmosphere with a most nauseous perfume. The harbor, moreover, was so narrow, that a vessel of a hundred tons, instead of swinging at anchor, was under the necessity of moving stem and stern." He further says: "The principal chief of the Indians, that lived in the neighborhood of the fort was an old

fellow by the name of Shakes, who, having been spoiled by the Russians with too much indulgence, was rather difficult to be managed; and he was, in fact at the bottom of every plot that was hatched against the whites, being assisted in this matter – so much for education – by a son who had been taught to read and write. . . . Luckily, though Shakes was the principal chief, yet he had comparatively little influence, while the second man in the tribe, who was friendly towards us, possessed a strong party in the village. The mutual jealousies of Quatskay and his lord paramount, which sometimes amounted to open hostilities, formed something of a safeguard to the fort. Shakes was from home but Quatskay paid his respects immediately on our arrival; and, in consideration of his general conduct, I presented him with an entire suit of clothes. The absent chief was said to be very cruel to his slaves, whom he frequently sacrificed in pure wantonness in order to show how great a man he was. On the recent occasion of a house warming, he exhibited, as part of the festivities, the butchery of five slaves; and at another time, having struck a white man in a fit of drunkenness and received a pair of black eyes for his pains, he ordered a slave to be shot by way at once of satisfying his own wounded honor and of apologizing to the person whom he had assaulted."

John Muir first visited Wrangell, July 14, 1879. He says: "The village was a rough place. No mining hamlet in the placer gulches of California, nor any backwoods village I ever saw, approached it in picturesque, devil-may-care abandon. It was a lawless struggle of wooden huts and houses, wrangling around the boggy shore of the island for a mile or so in the general form of the letter S, without the slightest sub-

ordination to the points of the compass or to building laws of any kind. Stumps and logs, like precious monuments, adorned its two streets, each stump and log, on account of the moist climate, moss-grown and tufted with grass and bushes, but muddy on the sides below the limit of the bog-line. The ground in general was an oozy, mossy bog on a foundation of jagged rocks, full of concealed pitholes. Indians, mostly of the Stickeen tribe, occupied the two ends of the town, the whites, of whom there were about forty or fifty, the middle portion."

I first visited Wrangell, July 26, 1911. As we approached it, I noticed from the deck that it had much the appearance described by Muir. The town followed the meanderings of the sea shore and the homes were backed into the marsh and bogs on the mountain side. Many old totem poles were in front of the buildings. The wharf was lined with Indian women who exhibited for sale their baskets and other curios. The street fronting the harbor had parallel with it a board walk that led around to and beyond the sawmill. Just opposite the landing were several general stores. The Presbyterian and Episcopal denominations had mission buildings fronting on the second street which ran parallel with the first. I saw one very poor horse in harness and about half a dozen cows grazing on the mountain side.

I visited the place many times afterwards. The most satisfactory visit was that of Sunday, August 17, 1913. Our vessel was at anchor long enough for me to explore the place pretty thoroughly. The Indians seemed to be observing the sanctity of the day and were dressed in their best. Some of the young maidens, gathered in groups before their dwellings, were truly



HOME OF CHIEF SHAKES AT WRANGELL, ALASKA

The left totem is the Ko-na-ka-dot, a sea monster, the right one is that of a bear that climbed Cone Mountain

handsome. Some of the stores were open and did a thriving business in selling curios to the tourists. In making a visit to the old Indian graveyard, I passed the sawmill, in the yard of which was the abandoned residence of Chief Cadeshan with its old, unpainted, and weatherbeaten totem poles in front of it. The graveyard was located on a point of land which extended into the harbor. It was a tangle of brushwood, wild grass, and weeds. The tombstones, many of which had totemic designs upon them, were moss-covered. One of them, marking two graves, bore the inscription, "Died, Emma Kassnek, June 18, 1899; Mary E. Kassnek, June 25, 1906." Many graves had been enclosed but the enclosures had now become decayed and fallen to pieces. Two Indians in a canoe very kindly rowed me across the slough that separates the graveyard from Shakes Island. There I met Chief Shakes, a descendant of the powerful Chief Shakes, who in former years ruled over the Indians of this locality, as a despot. I introduced myself to Shakes and presented him with a half dollar, which secured his confidence. He admitted me to his museum of Indian curiosities and very kindly told me what they were and their various uses. He then took me to his canoe-shed and showed me his two large canoes. They were the largest and finest canoes that I had ever seen. Shakes was very proud of them and regretfully spoke of the fact that the use of canoes was fast being supplanted by gasoline-launches. He conducted me to his residence and showed me his totem pole in front of it. It was fifty feet high and cost him five hundred dollars. It took the carver one year to carve it. Shakes told me that he was fifty-six years old.

In approaching to and departing from Wrangell a

very noticeable feature is that of a large volume of muddy water flowing over the dark green water of the ocean, clearly indicating the existence of the Stikine River, which, as we have seen, was not discovered by Vancouver. Wrangell on three sides is bounded by mountains, some of which are covered with glaciers.

From the mouth of the Stikine Mr. Johnstone and his party passed through Sumner Strait and entered Wrangell Strait, formerly known as Wrangell Narrows. The length of Wrangell Strait to the present town of Petersburg at its northern end is twenty-one miles. The navigation of the Strait is difficult and dangerous. The channel is narrow and intricate in places between dangerous ledges. The tides enter the Strait from both ends, and meet near Finger Point; they generally stand at high and low water about twenty minutes, and run each way six hours. The buoys in the Strait are placed for vessels going north and the aids to navigators are generally well-placed. The Strait presents the appearance of a lighted street or way. To a tourist a voyage through Wrangell Strait or Narrows is full of thrills and excitement. I have passed through it many times and have always enjoyed the experience.

Duncan Channel has its entrance three miles west of the entrance to Wrangell Strait. It is about twenty miles long and three-quarters to one and a half miles wide. Beecher Pass, four miles within the entrance, connects the canal with Wrangell Strait; it is filled with islets and rocks, showing much kelp. The soundings in the canal are usually less than twenty fathoms and somewhat irregular. Woedsky is a village with a post office, wharf, and mine on the west side of Woedowski Island. Petersburg is a post village on the east

side of Wrangell Strait one mile within its north entrance.

By noon of August 31, the Johnstone party reached a point from whence the continuation of (Sumner Strait) the great western branch was directed to the southwest. This appeared to increase greatly in width; it contained some islands and islets, particularly along the northern shore. Because of bad weather they could not obtain any satisfactory view of the surrounding regions. They had no doubt, however, that they had arrived in a very spacious arm of the sea, which was divided into three very large branches. That extending to the eastward they had already navigated, but that which appeared to be the main branch, being nearly three leagues wide, stretched to the westward and S.W.; the third, taking a S.S.E. direction, seemed also of importance, and had the appearance of being connected with (Clarence Strait) the main channel of the branch stretching to the northwest from Cape Caamano. As far as conclusions could be drawn from the view before them, it seemed pretty clear, that the second or southwesterly channel communicated with the ocean, but it appeared to be an object of too extensive a nature to enter upon, at a time when their provisions were much reduced, and at the close of their expedition. Accordingly, Mr. Johnstone declined prosecuting his researches any further, and directed his course towards the vessels.

Sumner Strait is one of the great inlets into southeastern Alaska from the sea. Properly speaking, it has three entrances. The main entrance from the sea, between Coronation and Warren islands, is five and three quarters miles wide. The entrance east of Warren Island, between it and Cape Pole, is one and a quarter

miles wide, and is used by vessels bound to and from Davidson Inlet and Bucardi Bay. The entrance between Cape Decision and the Spanish Islands is one mile wide, and is used by vessels bound to and from Chatham Strait. The usual track of vessels bound north from Clarence Strait is by way of Stikine Strait to Wrangell, and thence through Sumner Strait to Wrangell Strait. Vessels too large safely to make the passage through Wrangell Strait continue westward through Sumner Strait, round Cape Decision, and go northward through Chatham Strait or westward to the sea by way of Cape Ommancy. Smaller vessels that use Wrangell Strait during daylight at a favorable stage of the tide only sometimes pursue the same course to their advantage when not favored by such conditions. Vessels with local knowledge use Snow Passage in going from Clarence Strait to Sumner Strait, especially if bound west through Sumner Strait. This strait was justly named in honor of Charles Sumner, who in the United States Senate so eloquently urged the purchase of Alaska.

In the course of September 2, the Johnstone party passed three deserted villages, two of which occupied a considerable space, but they discovered no signs of the natives. On September 3, they were early in motion, but it was near sunset before they reached Cape Caamano, near which they were surprised by the sudden appearance of twenty canoes that seemed to contain not less than two hundred and fifty Indians. This was a very formidable body, especially so since experience had taught them that the inhabitants of those regions never went from place to place without being well-armed. Mr. Johnstone's party immediately put themselves on the defensive, and made signs to the Indians

to keep off. To this they paid no attention, and Mr. Johnstone seeing that they still advanced directly towards the boats, ordered a musket to be fired over them; but this having no effect, a swivel loaded with grape shot, was fired, sufficiently ahead of them to avoid doing harm, but near enough to show its effect. They then made a temporary halt but soon pushed forward again. A musket was then fired over the main body of the canoes, on which they stopped until the boats rowed past them, when they paddled over to the opposite shore. A light breeze having sprung up, favorable to the boats, they kept under sail all night and arrived on board of the vessels in Port Stewart the next morning, Wednesday, September 4.

On Thursday morning, September 5, Vancouver's vessels sailed out of Port Stewart and directed their course towards Cape Caamano, with the intention of proceeding by the channel through which Mr. Johnstone had returned to the branch (Sumner Strait) which he considered as communicating with the ocean. Because of unfavorable conditions of weather and sea, they were compelled to keep under sail all night without anchoring. The gale being attended with thick misty weather, rendered it most prudent for them to lie to, until about ten o'clock in the forenoon of September 6, when the wind abating, and the weather clearing up, they bore away along the northeast shore of (Clarence Strait) the northwest branch. The wind continuing to be favorable, they made great progress until near dark, when they anchored for the night in seven fathoms of water, on the north side of a small island, close under the shore of the Duke of York Island. Saturday morning, September 7, with fairly good weather they directed their course towards Point Nesbitt. By

noon they were all advanced in the passage between the Duke of York Island and Bushy Island. The wind having veered to the north, they were under the necessity of turning through this (Snow) passage, and in so doing they found the soundings were irregular from ten to twenty fathoms, and the bottom in some places rocky. The ebb tide which commenced about noon, was favorable, as it set to the north and northwest, so that about three o'clock in the afternoon they reached a spacious branch leading to the south and southwestward; towards this quarter their route was then directed. They observed that to the westward, the distant land was moderately elevated, and of an uneven surface, and very much divided by the water. These circumstances, together with the ebb tide setting strong to the westward, left little doubt of their finding a passage to the ocean by this route, but not without the prospect of its being intricate and dangerous. Their soundings were very irregular, shoaling suddenly from forty-five to seven, eleven and nine fathoms, deepening to fifty fathoms, and then no bottom with one hundred ten fathoms of line. About eight o'clock in the evening they gained soundings, and anchored in seventeen fathoms of water, near the southern shore.

A few Indians had visited them during the day, and by this time in the evening their number had considerably increased in six or seven canoes, who after they had performed their ceremonies, indicative of friendship, conducted themselves in a very orderly way. When they were made to understand that it was time for rest, the whole party immediately retired to the shore, where they remained until the following morning, September 8, when they repeated their visit with many songs, accompanied by a large augmentation to

their party. This addition was principally of women, who without the assistance of a single man, managed two or three medium sized canoes, and used their paddles with great dexterity. They were by no means disinclined to entertain Vancouver's party with their vocal abilities. Most of the full grown women wore large lip ornaments. As they were now visited by all ages, an opportunity was afforded to Vancouver of seeing the progress of this horrid piece of deformity in its several stages. He found that in their early infancy, a small incision was made in the center of the under lip, and a piece of brass or copper wire was placed and left in the wound. This corroded the lacerated parts, and by consuming the flesh gradually increased the orifice, until it was sufficiently large to admit the wooden appendage. The effecting of this cruel treatment was attended with the most excruciating pain, which they endured for a great length of time. These women appeared to possess in general a degree of liveliness and a cheerful disposition, very different from any they had before seen with this hideous mark of distinction, and but for it, some amongst them would have been entitled to be considered comely. Vancouver and his party were detained at this point by want of wind, and that gave them an opportunity of purchasing from these Indians a large supply of very good salmon and a few sea otter skins. In return for these, they received spoons, blue cloth, and tin kettles, with trinkets of different descriptions. In all the commercial transactions the women took a very active part, and it seemed that they were looked up to as the superior sex, for they appeared in general to keep the men in awe and under their subjection.

They now directed their course towards the northern

or what had been supposed to be the continental shore, to the westward of Point Mitchell, intending, as on former occasions, to survey as far as they possibly could in the vessels, before the boats again were dispatched; but, on a nearer approach to the shore, it proved to be so incumbered with rocks and rocky islets, that it became necessary to alter their intended mode of proceeding. Accordingly they crossed over to the southern shore, and before night were fortunate in finding an excellent port around the point considered at their preceding anchorage as the extreme southern shore. This point, after the first lieutenant of the *Discovery*, received the name of Point Baker. By seven o'clock in the evening of Sunday, September 8, they had anchored in sixteen fathoms of water. They had scarcely furled the sails, when the wind shifted to the S.E. and continued with increasing violence during the whole night. Grateful for protection in this port, Vancouver named it Port Protection.

From Port Protection a boat party under Mr. Whidbey followed Sumner Strait to its outlet in the ocean, while another party under Mr. Johnstone traced the supposed continental shore (really the present Kupreanof Island) as far as Point Barrie.

The last of the parties to return reached the ships on September 20. The boisterous state of the weather, the advanced season of the year, and the approach of long and dreary nights, left Vancouver in no doubt concerning the measures that he ought to adopt. His mind was by no means satisfied with the small extent, in a direct line, which had been examined during the late summer; yet he derived great consolation in the reflection that, in all probability, he had overcome the most arduous part of his task, and that his future researches

would be attended with less disappointment and fatigue. And further, that should the information he had thus obtained reach Europe, there would no longer remain a doubt as to the extent of the fallacy of the pretended discoveries said to have been made by Fuca, De Fonte, De Fonta, or Fuentes.

At this juncture Vancouver thought that it would not be amiss to assign names to some of the chief places along the coast. That part of the archipelago comprehended between Chatham and Fitzhugh sounds, lying immediately to the eastward of Queen Charlotte Islands, had been visited before them by several traders, particularly by a Mr. Duncan, who named them Princess Royal Islands, which name Vancouver retained. The continent adjacent to those islands, from Point Staniforth at the entrance of Gardner's Channel to Desolation Sound, the northern extent of New Georgia, he distinguished by the name of New Hanover, after His Majesty's hereditary German dominions. To the northward from Nepean Sound along the continental shore was a continuation of the archipelago, separated from the continent by Grenville's Channel and Chatham's Sound, nearly in a straight line; and northwestward from Chatham's Sound, was a farther and more extensive continuation of the same group of islands, separated from the continental shore by various channels, the most spacious of which was that by which the vessels arrived at Port Protection; this, in honor of his Royal Highness Prince William Henry, he called the Duke of Clarence's Strait. Its western shore was, as Vancouver believed, much broken and divided by water, forming as it were a distinct body in the great archipelago. This he honored with the name of the Prince of Wales' Archipelago; and the

adjacent continent, to the northward from Gardner's Channel to Point Rothsay, he distinguished with the name of New Cornwall. He considered the continental shore to have been traced to the conspicuous promontory at which Mr. Whidbey's last excursion terminated, and that its shores were there washed by the uninterrupted waters of the north Pacific, and that the extent of the discoveries of De Fuca, De Fonte, and other pretenders to a prior knowledge of these regions, must necessarily be decided, even admitting that such assumptions were true; hence he distinguished this promontory, situated in latitude $56^{\circ} 2'$, longitude $226^{\circ} 8'$ by the name of Cape Decision. This cape, as he then thought, formed the northwest continental point, and Cape Flattery, situated in latitude $48^{\circ} 23'$, longitude $235^{\circ} 38'$, the southeast point "of this very extensive archipelago." The western side of the intermediate space of this extensive group of islands, between these two promontories, excepting that part opposite to Queen Charlotte's Islands, formed the external or sea coast, and previously to this survey was generally laid down as the continental shore.

On September 21, the vessels departed from Port Protection and sailed through Sumner Strait into the open Pacific. On October 5, they reached Nootka and from there followed the coast southward as far as San Diego. Thence they set their course for the Sandwich Islands and, on January 12, 1794, dropped anchors at Karakoa at the west end of Owhyhee Island.

Cook Inlet

On March 14, 1794, Vancouver's little fleet was at Onchow in the Sandwich Islands. From here he appointed Cape Douglas in Cook's River as the next place of rendezvous with the Chatham in case of separation. There Vancouver proposed to recommence his survey of the coast of northwest America and from thence to trace its boundary eastward to Cape Decision, that being the point which it had been stated terminated the pretended ancient Spanish discovery. Accordingly at daylight of March 15, both vessels made sail and stood to the northwestward, surrounded by an immense number and considerable variety of oceanic birds.

On the very first night of the voyage, the ships parted company. Both continued onward, however, toward the appointed rendezvous. On the morning of April 12, the Discovery drew near the coast to the eastward of Cape Elizabeth, in latitude 59° , longitude $209^{\circ} 20'$. At half past one o'clock Vancouver steered the ship for the cape, and passed that promontory and entered Cook's River about half past five o'clock. The coast was composed of high land, before which were three small islands and some rocks; the cape was itself the largest and the most western of these islands. The thermometer now varied between forty and fifty degrees, and the snow, excepting in the deep chasms of the rocks, was melted to a considerable height on the sides of the hills, which, being well wooded, assumed a far more cheerful aspect than the country to the

southward. Spring seemed to be making so rapid a progress that Vancouver had every reason to indulge the hope of being able to carry his researches into execution without any interruption from the severity of the season.

As Vancouver concluded that the Chatham could not be far behind, if she had not already preceded them, he decided to proceed up the river and forthwith to explore it to its navigable extent. Accordingly, on the 14th, they hoisted anchor and, being favored with a flood tide, they steered northward. Shortly after noon of the next day, while at anchor, they were visited by three natives, each in a small skin canoe, who made their canoes fast alongside the ship and came on board with evident marks of being acquainted with European manners, by bowing very respectfully on coming upon deck. They made signs for snuff and tobacco, with which, and some other trivial articles, they seemed to be highly gratified, and expressed a degree of modest concern that they had not anything to offer in return. At dinner they did not make the least hesitation to partake of the repast offered them, with some wine and liquors; of the liquors they drank very sparingly, seeming to be well aware of their powerful effect. The weather was calm on their arrival; but towards evening a light breeze sprang up from the southward, and as they had lightly secured their canoes, the probability of their breaking adrift was pointed out to them. On this they made signs to know if the ship was going up the river, and on being answered in the affirmative by the same signs, they quickly gave Vancouver to understand that they wished to accompany him and that their canoes should be taken on board, and this was done.

On the 18th, they were visited by two more natives in a small canoe, who understanding the reception that their countrymen had met with, solicited the same indulgence; their canoe was accordingly taken in and they were permitted to remain on board, one of them, whose name was Sal-tarp, possessing some superiority over the rest, presented Vancouver with four marten skins, and received in return some iron, beads, a few other trinkets, and a small quantity of snuff and tobacco, all of which he seemed to value very highly. These people appeared to be acquainted with the Russians, of whose language they seemed to speak several words; but Vancouver's very confined knowledge of that language, as well as his total ignorance of their native tongue, prevented him acquiring the information he might otherwise have been able to obtain.

The ebb tide ran at the rate of five miles per hour, and at half past one on Saturday morning, April 19, the flood returned with equal rapidity; and having by three o'clock increased with a velocity that the best bower cable was unable to resist, it broke, and the buoy sinking by the strength of the current, the anchor and cable were irrecoverably lost. This was an accident that gave Vancouver very serious concern, since his stock of these important stores was already much reduced. As it was now becoming daylight, they proceeded up the river, with the flood tide and a light variable breeze in the northern quarter, attended with very severe weather. They kept near the western shore to avoid being entangled with the shoal and by this means lost much of the influence of the flood; so that on the ebb making about seven o'clock, they had not advanced more than two leagues. Here they again anchored in thirteen fathoms of water in latitude $60^{\circ} 51'$.

Their Indian friends now gave Vancouver to understand that their habitations were in this neighborhood, on the western shore, and desired to take their leave; they departed showing a very high sense of gratitude for the kindness and attention with which they had been treated.

The explorers continued to be much hampered by cold weather, floating ice, and shoals. On the 24th, Vancouver led a party to seek a supply of fresh water and a sheltered place for the ship. They soon found a stream of excellent water on the eastern shore, which, with little labor in clearing away the ice, could be very conveniently obtained. Their attention was now directed to a bay or cove that seemed to be situated to the southward of a cliffy point, where Vancouver entertained hopes of finding a commodious resting place for the ship, free from the inconvenience of the drifting ice, which seemed likely to occasion much annoyance. On reaching the south point of the bay, they observed near the edge of the steep cliffs that formed it, some houses; these were visited but found to be scarcely more than the skeletons of habitations that had apparently been some time deserted. The large ones were four in number, of a different shape and construction from any houses of the northwest American Indians they had yet seen. One was twenty-four feet long, and about fourteen feet wide, built with upright and cross spurs, had been covered with the bark of the birch tree, and when in good repair must have been a tolerably comfortable dwelling.

Having anchored the *Discovery* as conveniently to the shore as circumstances would permit, Vancouver's party set themselves earnestly about the several necessary duties they had to perform, amongst which was

the procuring of wood and water from the shore. This service was greatly interrupted by the floating ice, which by the rapidity of the tides was rendered very dangerous to their boats, the utmost caution being required to prevent their being crushed, not only when they were alongside the ship, but in their communication with the land, by the ice which was in motion, and by that lodged on the shore, against which the more buoyant masses, though of considerable size, were driven with great violence and dashed to pieces. Some anxiety was likewise felt for the safety of the cables, though every precaution was taken for their protection.

In the afternoon, they were visited by twenty-three natives in a large skin canoe. These people were destitute of any weapons, and were conducted by a young chief named Chatidooltz, who seemed to possess great authority and to be treated with much respect by every individual of the party, whose humble demeanor manifested the inferiority of them all, excepting one named Kanistooch, who appeared to be somewhat younger than the chief, and to whom also the rest showed much attention. This man attended the chief on all occasions, and was the only one who was permitted to sit on the seat with him, the others squatting down on the deck.

Some of the gentlemen in quest of game on shore, had fallen in with a family of about eighteen Indians, from whom they received the kindest attention and civility; and they had in turn invited four or five of them on board, which invitation was readily accepted. The latter party were evidently of a different tribe or society from those with Chatidooltz, but they nevertheless were upon amicable and friendly terms and passed a most cheerful evening together, and seemingly much

to their mutual satisfaction. After eating a hearty supper of salt meat and biscuit, they rested very quietly until the next morning, when each of the party received from Vancouver presents of snuff and tobacco, ear shells, iron chisels, beads, hawk's bells, buttons, and needles, all of which seemed to be highly valued, and were accepted with expressions of the most grateful acknowledgement. On Sunday, April 27, as the drift ice did not seem to be in such abundance as on the preceding day, the chief and his party took their leave and evinced their appreciation of the treatment they had received by singing as they paddled around the ship.

The drift ice had lately been considered in a diminishing state; but, contrary to their expectations, it was much augmented by flood tide, the large masses were driven by the increased rapidity of the spring tides, which now moved at the rate of nearly five miles an hour, against the bowels of the ship with alarming violence. The following day, Tuesday, April 29, brought no favorable alteration; the quantity of ice and the rapidity of the tide, particularly on the flood, were greatly increased and were truly alarming. One large body of ice hooked the small bower cable, and with the violence of the tide broke it about fifteen fathoms from the bow; at the same time the cable of the best bower, by which alone the ship then rode, was constantly pressed with such immense weights that they would have had no hope of its holding had it not been a new sixteen-inch cable, nearly three inches in breadth. Notwithstanding, however, their situation was extremely uncomfortable, for in the event of its breaking they would then be reduced to only one anchor and a thirteen-inch cable for their preservation. All communi-

cation with the shore was at an end, and their apprehensions for the ship's safety were now increased by the violence with which the ice, nearly as hard and ponderous as the solid rock, was frequently driven against the ship, occasioning fears lest the hull of the vessel should sustain some material injury. In addition to these unpleasant circumstances, on heaving in the slack of the cable at high water, they discovered it to be chafed, by it having rubbed against some rocks on the bottom. Fortunately toward slack water they observed some short intermission from these threatening dangers, in one of which, about noon of Wednesday, April 30, by means of creeping they fortunately hooked the broken cable; but the rapid return of the ice with the flood afforded but sufficient time to affix a buoy to it, for the purpose of recovering it with more facility at the next favorable opportunity.

Just about the time of high water, they were visited by ten Russians and about twice that number of Indians, in a large open row boat. On their arrival the ship was tolerably quiet, but on the return of the ebb they were so incommoded by the ice, that the visitors expressed great concern for their safety. They frequently asked if the ship did not take much water and whether Vancouver was duly attentive to that particular. This was perhaps suggested to them by not seeing the pumps at work, for whose services very fortunately there was little need. If Vancouver rightly understood, they had come with the intention of passing the night with him; but after remaining on board three very unpleasant hours, they took advantage of an extensive open space between the fields of ice and departed. Vancouver being ignorant of the Russian language, and his mind being filled with the greatest

anxiety, was ill calculated for the reception and entertainment of the strangers, and consequently he was not likely to benefit from their conversation, or by any information they might have been able to communicate. They, however, very clearly gave Vancouver to understand that his anchorage was not in a river but in an arm of the sea, which finally closed about fifteen versts beyond the station they had taken.

One of the Russian establishments, Vancouver understood, was about eight miles to the southeast of East Foreland, where a Russian two-masted vessel was then lying; they had another near North Foreland, whence the party had come; and a third on the island of St. Hermogenes. Vancouver understood that in Prince William Sound the Russians had an establishment in Port Etches, and another near Kayes Island. Throughout the whole of the conversation, they seemed to use every endeavor to impress Vancouver with an idea that the American continent and adjacent islands, as far to the eastward as the meridian of Kayes Island, belonged exclusively to the Russian empire.

On Thursday, May 1, the explorers had the satisfaction of seeing a less quantity of ice brought up by the flood tide, and at low water they had the good fortune to recover their anchor and cable. The next day, however, they were again much inconvenienced by the ice, and in the hope of a clearer bottom, they shifted their station a little to the southeastward, but by no means improved their condition; for at low water the cable was found to have hooked to a rock, and whilst they were endeavoring to clear it, the ship on suddenly swinging inshore grounded, and so remained until she was floated off by the return of the flood tide. On

sounding, much more water than the vessel drew was found close around her; and it was reasonable and supposed that the ship had rested on one of those apparently movable fabrics of rock which lie in great numbers over all the shallow flats extending from these shores. At the slack of flood tide, with a light breeze from the south, they weighed, stood more into mid-channel, and anchored in twelve fathoms of water with sandy bottom. The weather altered and a material change took place on Saturday, May 3. The sky was obscured by a thick misty rain and fog that continued until forenoon of Sunday, May 4, when the weather became again fair and pleasant and they had the satisfaction of seeing the surface of the water nearly free from ice, and of recommencing their business with the shore.

Meanwhile, Mr. Whidbey with two boats had been exploring the River Turnagain, which proved to be really an inlet rather than a stream. On this expedition, from which they returned on May 4, they saw a number of Indians and also visited one of the Russian posts, located on North Foreland. At this station there was only one large house, about fifty feet long, twenty-four feet wide, and about ten feet high; this was the residence of nineteen Russians, under the direction of an elderly man, who conducted the party into the house by a small door, which was its only entrance, and seated them at a table at the upper or further end of the habitation on which was placed a repast, consisting of dried fish and cranberries; but the offensive smell of the house prevented any relish for these dainties, and their host perceiving their reluctance to partake of them ordered the cranberries to be taken away, and after they had been beaten up with some train oil, they

were reproduced, with the hope of their being rendered in this state more palatable. These hospitable endeavors to entertain the visitors proving unsuccessful and Whidbey's party having sacrificed as much to politeness as their stomachs would bear, they felt great relief in once more breathing the pure though cold air, and returned to their tents; there the badness of the weather detained them the following day and afforded them an opportunity of repaying the intended hospitality of their Russian friends, who very heartily partook of such cheer as the party had to offer. By the assistance of a very indifferent interpreter, Mr. Whidbey understood that the Russians had been at this station nearly four years, yet there was not the least appearance of cultivation, although in the summer season the soil most probably was capable of producing many useful articles of food. This, however, seemed to be of little moment to the Russian residents, as they appeared to be perfectly content to live after the manner of the native Indians of the country; partaking with equal relish and appetite of their gross and nauseous food, adopting the same fashion and using the same material for their apparel and differing from them in their exterior appearance only by the want of paint on their faces and by their not wearing any of the Indian ornaments.

The Whidbey party having returned to the ship, it only remained for Vancouver to determine the extent of the inlet they were in. On May 6, accompanied by Mr. Baker, Mr. Menzies, and others, he departed with the yawl and small cutter, provided with supplies for four days. Their examination was directed along the western shore, and they were not long in determining that, at a little distance from the place where they

had formerly sounded, the shoals, which were dry at low water, connected the two shores together; and from an eminence they ascended, they saw the space beyond, which at high tide became an extensive sheet of water, then occupied by numberless banks of sand, one behind the other, with small pools of water between them. Notwithstanding these indicated that any further examination was unnecessary, Vancouver resolved to continue their researches as far as the inlet might be found navigable for the boats; and for that purpose they kept on the western shore, although they could not approach very near to it, on account of the shoals that extended from it, on which were lodged a very large quantity of ice. The depth of water was generally one, two or three fathoms, very irregular, and now and then four fathoms at about half flood. As they advanced to the northeast, the western shore gradually inclined towards the eastern shore, until the shores were not more than half a mile asunder, forming still a small continuation of the branch, in which they found from eight to twelve feet of water at nearly high tide; this they followed about two miles, when their curiosity became satisfied by seeing the eastern bank unite with that of the western side and terminate in a circular form, the most distant part being about a half a league from them, in which space were some banks of dry sand.

The shores they had passed were compact; two or three small streams of fresh water flowed into the branch between low steep banks; above these the surface was nearly flat and formed a sort of plane, on which there was no snow, and very few trees. "This plane stretched to the foot of a connected body of mountains, which excepting between the west and

northwest, were not very remote; and even in that quarter the country might be considered as moderately elevated, bounded by distant, stupendous mountains covered with snow, and apparently detached from each other; though possibly they might be connected by land of insufficient height to intercept their horizon." This is the first mention of what is now known to be the highest mountain in all North America, namely, Mount McKinley, or, as it is known to the Indians, Denali. This mountain has a height of about 20,700 feet. Dr. Cook claimed to have climbed it in 1906, and his success in this imposture encouraged him to undertake the more gigantic hoax of pretending to reach the North Pole. Repeated efforts were made by expeditions to reach the "Top of the Continent," but it was not until 1913 that a party under Archdeacon Hudson Stuck finally reached the apex of the highest peak.

To the northward, around by the east and towards the southeast, the near mountains, though of a height inferior to those in the opposite region, were capped with snow and appeared to form an uninterrupted barrier; the descending plains from which seemed, by their apparent uniformity, to indicate no probability of their being anywhere intersected by water. That which flowed between the banks of the river still retained a very considerable degree of saltiness, and clearly proved that neither by falls, flats, marshes, or fens, any large body of fresh water found its way to the ocean by this communication, and consequently, according to the general acceptation of geographical terms, this could be no longer considered as a river; Vancouver, therefore determined to distinguish it henceforth as an inlet. Thus terminated this very ex-

tensive opening, to which, had the great discoverer of it, whose name it bore, dedicated one day more to its further examination, he would have spared the theoretical navigators, who had followed him in their closets, the task of ingenuously ascribing to this arm of the ocean a channel through which a northwest passage might be discovered.

Vancouver's party returned to the ship the same day. In the evening, two guns were heard in the offing, and, next morning, May 7, a brig was seen at anchor before the entrance. She proved to be the Chatham and, about noon, Mr. Puget came on board. From him Vancouver learned that, on the evening of the separation of the Discovery and Chatham, the Chatham had carried a press of sail in order to keep up with the Discovery, which, together with a very heavy, irregular sea, occasioned her to labor extremely, and yet she made so little progress, that her distance from the Discovery gradually increased until the latter was no longer visible.

In passing Point Banks, the Chatham had been visited by two Russians, who, by the help of an indifferent interpreter, informed Mr. Puget that no vessel had gone up the inlet that season; and from this he concluded that they would precede the Discovery in her examination. By the most intelligent of the two, whose name was George Portoff, they were also informed that to the southeast of Point Banks they had passed a very fine harbor, where the Russians had an establishment, and where a sloop, mounting eight carriage guns, was then lying, under the command of Alexander Baranoff. Portoff stated that this establishment consisted of forty Russians, that they had another of equal consequence in Prince William's Sound, and

some smaller ones up the inlet. On their departure they very obligingly took charge of a letter which Mr. Puget had addressed to Vancouver, communicating the information of the Chatham's arrival, and the plan of operation he intended to pursue. Subsequently the Chatham was visited by a number of other Russians and by many natives.

On their way out of Cook Inlet the vessels stopped (May 10) near the Russian post on North Foreland. By invitation Vancouver and others visited the Russians. On their arrival they were saluted by a discharge of artillery and were met at the landing by some Russians, who came to welcome and conduct them to their dwelling by a very indifferent path, which was rendered more disagreeable by a most intolerable stench, the worst, excepting that of a skunk, Vancouver had ever the inconvenience of experiencing. This was occasioned Vancouver believed by a deposit made during the winter of an immense collection of all kinds of filth and offal, that had now become a fluid mass of putrid matter, just without the railing that included the Russian factory, over which these noxious exhalations spread and seemed to become a greater nuisance by their combination with the effluvia arising from the houses. The visitors were, however, constrained to pass some time in this establishment, which occupied a space of about one hundred and twenty yards square, fenced in by a very stout paling of small spurs of pine and birch, placed close together about twelve feet high. These were fixed firm in the ground, yet they appeared to be a very defenseless barricade against any hostile attempts, even of the Indians, as the whole might easily be reduced to ashes by a fire on the outside, as could also their houses within the fence, these being built

with wood and covered with thatch. The length of these, resembling in shape a barn, was about thirty-five yards long, about as many feet in breadth and about ten or twelve feet high; this was appropriated to the residence of thirty-six Russians, who, with their commander, Mr. Steven Zikoff, then on an excursion to Prince William Sound, comprehended the total number of Russians at this station; all of whom, excepting the commander, resided in this house, which principally consisted of one enormous room, answering all the purposes for shelter, feeding, and sleeping.

The only refreshment was some cold boiled halibut and raw dried salmon, intended to be eaten with it, instead of bread. This very homely food produced them no disappointment, for had it consisted of the greatest delicacies they would not have been inclined to have partaken of the repast in a place where the atmosphere was so extremely offensive. This occasioned the shortening of their visit as much as common civility would allow; and as they prepared to seek the relief of purer air, they were attended by the two leaders and were shown the rest of the settlement. They found it to consist of a smaller house situated at the west end of the larger one in which Mr. Zikoff, the commander, resided, and about twenty others of different dimensions, all huddled together without any kind of regularity, appropriated to the depositing of stores, and to the educating of Indian children in the Russian language and religious persuasion; there were also the residences of such of the natives as were the companions or the immediate attendants on the Russians composing the establishment.

His curiosity and inquiries being thus satisfied, Vancouver invited the two gentlemen to accompany them

on board, with which they readily complied. They presented Vancouver with a few skins of the land animals found in that neighborhood, and a very fine halibut, which was highly acceptable, as it was the first fresh fish the explorers had procured that season. Vancouver greatly wished to meet Baranoff, who he had been given to understand was the commander of all the Russian establishments at Kodiak about Cook Inlet, but in this wish he was, for the time being, disappointed. As the Russian leader did not arrive, the ships sailed out of Cook Inlet and steered for Prince William Sound.

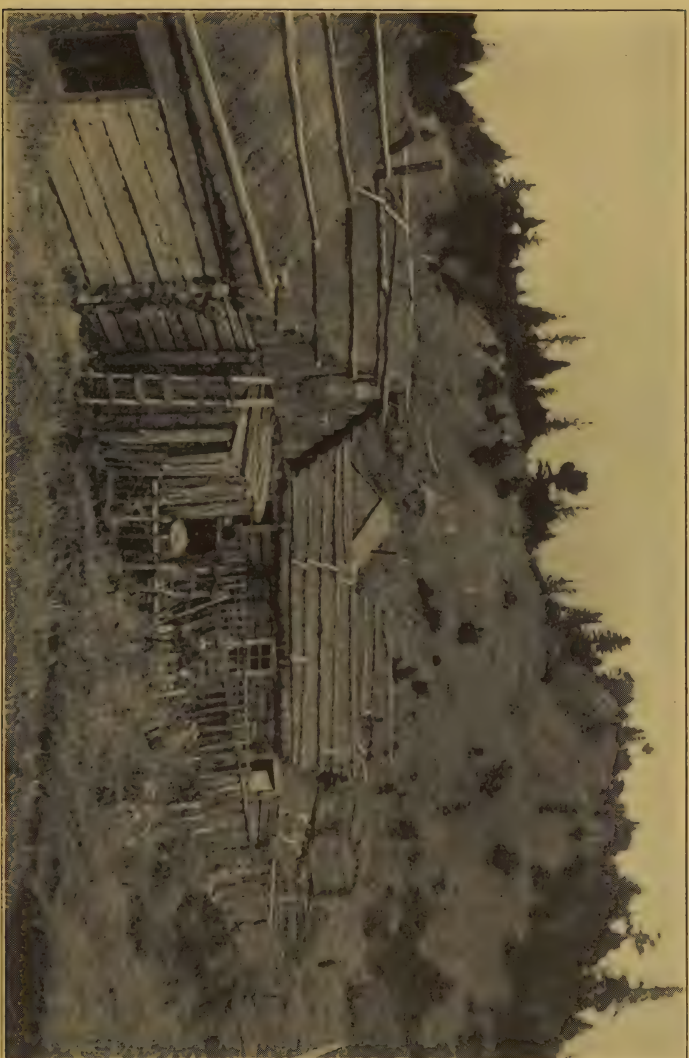
Cook Inlet, Kenai Peninsula, and Kodiak Today

Cook Inlet was named after Captain James Cook, whose voyages of discovery have often been referred to in these pages. The Inlet and Kenai Peninsula were known to roving Russian fur-traders before Cook's visit. These adventurers already had a permanent trading post on Kodiak Island and were navigating adjacent waters in search of the valuable sea otter. To Cook, however, must be credited the first survey of the shore of the peninsula.

Kenai Peninsula lies between Prince William Sound and Cook Inlet and is almost separated from the rest of the continent by the waters of Passage Canal or Portage Bay and Turnagain Arm, branches of Prince William Sound and of Cook Inlet respectively, which reach within about nine miles of each other. The peninsula includes two geographic dissimilar and sharply separated districts, the Kenai mountains and Kenai lowlands. The former, embracing about six thousand, five hundred square miles, includes all of the mountainous or eastern and southeastern parts of the peninsula; the latter comprises about two thousand, nine hundred square miles in the western part of the peninsula, bordering on Cook Inlet, south of Kachekmak Bay. The southern and eastern parts of the mountains are occupied by glaciers, which in each part consist of one great central ice mass from which many large valleys and tongues radiate, and near which lie smaller

separate glaciers. Most of the Kenai lowlands stand only fifty to one hundred feet above the sea level, although the ridge on the north shore of Kachekmak Bay is over two thousand feet high and the surface of the land slopes up to about the same altitude at the edge of the mountain between Tustumena and Shilak bays.

The climate of Kenai Peninsula, like that of all the Pacific coast of Alaska, is characterized by cool summers and by winters that are rather mild for the latitude. The effect of the warm ocean currents is felt here as elsewhere along the coast. The Kenai lowlands are covered with a growth which consists of mixtures of spruce, hemlock, birch, and poplar in groves between which lie open meadows or patches of small bushes. Native grasses are abundant, especially in the Cook Inlet region, which contains broad acres of natural grass lands. There is also a considerable aggregate area of patches of grass land in the mountain provinces, especially around timber and in the upper timberless parts of the valleys. This peninsula is well and favorably known as a big game country; both brown and black bears are native to the peninsula, the black bear being by far the most abundant. The fur-bearing animals, other than the bear, include the lynx, ermine, mink, marten, and land otter. Porcupines are abundant and easily obtained. Moose are very abundant in the central and western part of the peninsula. Mountain sheep are numerous, but mountain goats are rare. Grouse, ptarmigan, and shore birds as well as waterfowl such as ducks, geese, brant, swans, snipes and curlew are found in most parts of the peninsula. Trout are found in many of the mountain streams and lake trout, white fish, and a few grayling are reported in the large lakes. In summer, salmon in great num-



KENAI NATIVE HOUSES

bers run up most of the streams that flow into Resurrection Bay and Cook Inlet.

For many years after the transfer of Russian America to the United States the industrial conditions of Kenai Peninsula changed but little. In 1889, an ill advised attempt was made to develop the lignite coal at and near Kachekmak Bay for export to the western coast of the United States. About 1890, gold was found in beach placers at Anchor Point, on Cook Inlet. In 1894, the gold placers of Bear and Palmer creeks were found. This led in the next two years to an influx of prospectors into a region which up to that time had been known only to fur-traders. These prospectors swarmed on the peninsula and began mining in many places. In 1896, a gold bearing quartz lode was found near Moose Pass but this excited little interest. The present industrial condition dates from 1902, when a railway leading inland from Resurrection Bay was projected, the construction of which began in 1903. About this time the presence of high-grade coal in the Matanuska valley became known and the Fairbanks gold district was discovered. A patent was obtained to the Seward town-site and a settlement quickly sprang up. The coal-land controversy which delayed the opening of the Matanuska coal field so discouraged the promoters of the railway enterprise that they completed only seventy-two miles of what was known as the Alaska Northern Railway. The importance of building railroads in Alaska having become apparent, the question arose whether they should be left to private interests, or should the United States construct and own them. The matter was definitely decided March 12, 1914, when Congress voted in favor of government ownership. By this act of Con-

gress the President was directed to "locate, build, or purchase and operate" a system of railroads at a cost not to exceed thirty-five million dollars. William E. Eads was made chairman of the railroad commission. Construction was commenced in 1915, with Woodrow at the mouth of Woodrow Creek (Anchorage P. O.) on Cook Inlet for a base. The Alaska Northern Railway was purchased and became part of the system. The road, beginning at Seward, was to run along the southern coast through the Susitna valley and Broad Pass to the Tanana River, with a terminal at Fairbanks. Its length, including a short branch to the Matanuska coal fields, was to be five hundred and four miles.

Cook Inlet, lying about one hundred and fifty miles west of Prince William Sound, is an immense bay covering more than ten thousand square miles, and extending over two hundred miles inland. It differs from the other indentations of the Pacific coast of Alaska in heading well behind the coastal ranges and in having broad tributary valleys, which are drained by long rivers. St. Augustine, Iliamna, and Redoubt volcanoes are conspicuous and useful navigation marks in the lower inlet, and likewise Mounts Susitna and Spurr in the upper inlet. The shoals of the inlet are generally strewn with boulders.

I voyaged in and through Cook Inlet September 28-31, 1914, having arrived in Port Graham at six o'clock in the morning of the 28th. This port is on the east side of Cook Inlet, four miles northward of Flat Island, and is a secure harbor inside Passage Island, and with care is easily entered in daytime. Its entrance, between Russian Point and Dangerous Cape, is about two miles wide, and has extensive outlying reefs,

covered at various stages of the tide. The dangers are generally steep-to and are marked by kelp in summer and autumn. I here measured a sea-cabbage or sea-onion kelp that was thirty-seven feet long. Russian Point on the south side of the entrance lies about two and a quarter miles northward of Flat Island. Alexandrovsk, a small Indian village with a Greek church, is on the northeast side of English Bay, about three hundred and fifty yards southeastward of the point. Dangerous Cape, on the north side at the entrance, lies five miles northward of Flat Island. Passage Island one mile inside the entrance, is one hundred and forty feet high and wooded. Above Passage Island the port is four and a half miles long, and one-half to three-quarters of a mile wide, with depths of ten to seventeen fathoms of water. The shores are fringed with kelp to a distance of two hundred yards. The safest time to enter the port is at low water, and the better entrance is north of Passage Island. There is a wharf and fish cannery on the south side of the port, one and a half miles above Passage Island. The extensive buildings, now used as a cannery, were built by the Alaska Coast Trading Company for a storage and shipping place for points up Cook Inlet. The Company lost a lot of money. The Fidalgo Island Packing Company bought the plant and converted it into a fish cannery. The original house, well built, is still standing, and is used for a mess-room. Other buildings with a good wharf have been built. Nine thousand cases of salmon were shipped from the cannery in 1914. The plant, at the time I was there, was in charge of a custodian who would remain there until the next canning season. He showed me half of a bomb-shell, an ax, and a small coal pick that he had

exhumed from an old Russian coal mine at Alexandrovsk. He kindly offered to let me take the choice of them as a souvenir and I chose the pick and have it on the table in my library; it is badly rusted.

Vancouver frequently makes mention of the skin boats used by the Russians and Indians in Cook Inlet. These were of three kinds. One was a large open flat-bottomed boat consisting of a wooden frame tied with sealskin thongs with the skins of the seal properly oiled and sewed together stretched over the frame and held in place by walrus-skin lines. This kind of boat was known among all the Indians by the name of oomiak. The second, a smaller boat for one man, was made essentially in the same way, but completely covered over, except a hole in which the occupant sat, and around the projecting rim of which, when at sea, he tied the edge of a waterproof shirt, called a kamlayka by the Russians. This was securely tied around the wrist and head, and the head was covered with a hood, so that the water could not penetrate to the interior of the boat. This boat was called by the Indians a kayak. The third kind was used only by the Russians and was copied from those of the Aleutians, differing from the last only in being longer and having two or three holes, and by the Russians called two or three holed bidarkas. They were very light and strong, and with persons skilled in their use, it was almost impossible to swamp them. They were propelled by single or double ended paddles, and by this means were made to attain great speed. The only one of these boats that I have seen was a one-hole bidarka that I saw at Port Graham. It had been finished by an Indian and hung outside of his hut to season. It was a light and admirably constructed boat.

We passed from Port Graham to Seldovia Bay on the southeast side of Kachekmak Bay. The last named bay is characterized by boulders, which can be seen strewn along the shores and extending towards the deep water. The shore is mountainous, with cliffs and slides in many places, and there is no timber except at the north end of the bay. So far as surveyed the shoaling is abrupt on approaching the reefs which fringe the shores. Fox River empties into the bay at its head.

Seldovia is a village and post office, with several stores, a small hotel, and a Greek church, on the east side of the harbor, one quarter of a mile southward of Watch Point. The village has in it a few white men and about one hundred and fifty Indians. The Indians are a well appearing people. A wharf and fish cannery are on the eastern side of the harbor five-eighths of a mile southward of Watch Point. Seldovia is a beautiful place with its background of mountain scenery; its Greek church is on an elevation that overlooks Kachekmak Bay and the surrounding country; near by is a graveyard with red and white crosses marking the graves. It has a very pretty beach.

The eastern shore at the entrance of Cook Inlet is mountainous, with steep slopes from the water in the vicinity of Points Adam and Bede. The mountains trend northeastward between Kachekmak Bay and the sea, and then extend across to the head of Turnagain Arm. The greatest elevations occur about half way up the Kenai Peninsula, where there are numerous glaciers. Homer Spit is low and gravelly at the entrance to Kachekmak Bay; is three and a half miles long, from one hundred to five hundred yards wide, and covered with grass and some trees. Homer, a native village at the head of the spit, has been prac-

tically abandoned. From Homer Spit to Anchor Point, the coast is a line of bluffs, with a greatest height of seven hundred and fifty feet at Bluff Point. In front of the bluff there is a narrow beach. There is a light on Anchor Point. Ninilchik is a small native settlement with a Greek church at the mouth of the Ninilchik River. The church and a part of the village are prominent from well off shore. North of Cape Ninilchik the coast is very foul, being characterized by immense boulders not marked by kelp. Apparently the boulders rest on a comparatively flat bottom, so that soundings give no indication of them.

Kasilof is a fish cannery on the western bank of the mouth of Kasilof River. An extensive flat with boulders in places fills the bight between Cape Kasilof and the mouth of the river, and extends off shore two and a half miles. The river is narrow and has a strong current. Boats up to six feet in draft can lie afloat in the river at low water. This river has its source in Tustamena Lake. Kenai is a fish cannery and post office on the southern bank at the mouth of Kenai River. This river has its source in Skilak Lake. Salamato is an old village, four and a half miles northward of Kenai and six miles southeastward of East Foreland, which is a prominent, nearly level, wooded headland, with a bluff two hundred and seventy-six feet high. There is a light on the highest point of the bluff. Nikishka is a fish trap and house two and a half miles northeastward of East Foreland. From the fish house northward nearly to Point Boulder, a distance of two and a half miles, boulder shoals, bare in places at low water extend three-quarters of a mile from shore. Beginning at Point Boulder, a prominent boulder reef with but few breaks in it extends along the

shore to Point Moore, a distance of twenty miles. For the greater part of this distance the boulders, some of which are very large, show at low water to a distance of two miles from shore, and there are occasional ones which show above high water.

Point Possession is a low, rounding, heavily wooded headland, with a bluff at the shore-line. There is a small native village on the western side of the point, where the bluff is low and a valley leads inland. The bluff is one hundred and forty feet high, seven-eighths of a mile southward of the village, and from the village it increases in height northeastward around into Turnagain Arm to a greatest elevation of two hundred and eighty-four feet at Grand View. Temporary anchorage for a small vessel may be had three-quarters of a mile from shore and two miles southward of the village in four fathoms of water with sandy bottom. It is sheltered from easterly and southeasterly winds, but a considerable sea makes around Point Possession at times from the violent northeasterly winds that blow at intervals out of the Turnagain Arm. This arm was named by Captain Cook. He thought that Cook Inlet was a river, of which the arm was a branch. Thereupon at its entrance he exclaimed in disappointment and chagrin, "Turn again!" and thus this arm got its name. Most of this arm at low water is a large mud flat interspersed with winding sloughs, and navigation in it is safe only for small craft of six feet or less draft.

Knik Arm has sufficient depths for deep draft vessels, with the exception of the bar at the entrance. This bar has been created by the detritus carried into it from the Matanuska and Knik rivers. The former of these has its source to the northward in Lake Matanuska, and the latter in Knik Glacier to the eastward. The

generally used anchorage at the head of Cook Inlet is the bight between Woodrow Creek and Cairn Point three miles northward of Point Mackenzie, where good depths extend fairly close to the shore. It was in this bight that our vessel made its final anchorage. The local headquarters for the construction of the government railroad around Turnagain and Knik arms are located here. At the time of our anchorage there was only a small village at this place. A company of government engineers were camped on the beach. Since then the town of Woodrow with a large population has come into existence, with a post office, general stores, blacksmith and machine shops. It is a port of call for all steamships making Cook Inlet, and has telephone and telegraph communications with Seward. From the Woodrow anchorage we were taken in a gasoline launch to Knik, a village on the western side of Knik Arm. This is a "jumbled up little town" with three stores and a population of about three hundred inhabitants. It has been the headquarters for miners going into the interior of Alaska. The Knik country formerly had a large Indian population but I am told that at least two-thirds have died in the last quarter of a century.

On the western side of Cook Inlet, from Cape Douglas to Chink Island, the mountains generally rise abruptly from the water, and the Iliamna and Redoubt volcanoes tower well above the surrounding peaks. Northward from Redoubt Volcano the higher snow-clad peaks trend away from the inlet, passing through to the lofty Mount Spurr. Iliamna Volcano has an altitude of ten thousand and seventeen feet and is clad in eternal snow; it emits smoke

almost constantly. It was in eruption in 1854, and running lava has been found near the lower crater. There are many hot and sulphurous springs on its sides. Redoubt Volcano has an altitude of ten thousand, one hundred and ninety-eight feet. It was in eruption in 1867, and ashes from it fell on islands more than one hundred and fifty miles away. Both of these volcanoes were emitting steam or smoke when I was in Cook Inlet.

Iliamna Bay is the northwestern corner of Kamishak Bay about fifteen miles from St. Augustine Island. It is one mile wide at the entrance and wider inside, and has a length of about five miles to its northern end, and is the head of the western arm, called Cottonwood Bay. The greater part of the bay is filled by a flat, but there is good anchorage just inside the entrance. The shores are mountainous, bare, bleak, and forbidding. From the small native village in the cove one mile from the north end of Iliamna Bay, a trail about twelve miles long leads to the town of Iliamna on a river of the same name four miles from Iliamna Lake.

When in Iliamna Bay, I learned the story of the sinking in it, in the winter of 1910, of the steamship Northwestern, commanded by Captain Hunter. About thirty passengers were on board the steamer, all of whom were saved; also provisions sufficient to feed and materials to cover them. It was two months before they were rescued, during which time they suffered intensely from the extreme cold of the winter. For fuel they had to depend upon what they could get by cutting willow bushes and had to stew their salmon in tin cans. A part of the crew were sent to Kodiak in an open boat, but on account of the extreme cold got

only fifty miles on their way when they put into an Indian village with their hands frozen; this caused them great suffering.

The Susitna River is navigable for stern-wheel steamers of two or three feet draft to the Talutna River, a distance of about sixty-eight miles, but this can only be done at good stages of high water. The tides are not felt more than seven miles up the Susitna, and above this the current is swift. Susitna, the principal base of supplies, is on the Susitna about eighteen miles above the entrance and just below the mouth of the Gentna.

Our steamship, the Admiral Watson, sailed from Iliamna Bay to Kodiak, and in doing so passed St. Augustine Island, and through Marmot Strait, between Afognak and Marmot islands. En route we saw white whales, black fish, and porpoises sporting in the sea. The Afognak and Kodiak groups of islands lie southwestward of Cook Inlet, and are separated from the mainland by Shelikof Strait. The Kodiak group is about one hundred and fifty-five by fifty-four miles in extent, with its greatest length in a southeasterly direction. The land is rugged and mountainous with elevations of two thousand to three thousand feet along the shores, and in excess of four thousand, five hundred feet in the interior. The shores are rugged and rocky, and are indented by numerous narrow inlets, in which are numerous rocks and reefs.

Stephen Glottoff, a Russian explorer, who had wintered at Cooper Island and sailed from there July 26, 1763, discovered the island of Kodiak and wintered on it. He was obliged to use great caution as the natives evinced many symptoms of hostility. He left the island in May, 1764, and arrived at Uninak July 3.

He reached home in July, 1766. In 1787, Samoyloff took charge of the factory at Three Saint's Bay, Kodiak Island; Delareff, in 1778, determined astronomically the situation of Three Saint's Bay on Kodiak Island. In 1789, an expedition in charge of Joseph Billings arrived at the island and wintered there. Billings left the island, July 30, 1790, in which year Gregory Shelikoff organized the Shelikoff Fur and Trading Company. During the same year, by a ukase, Catherine II made E. Delareff, a Greek, who had been long on the island, chief director of the affairs in the colony, and Alexander Baranoff, a sailor who had shown great energy in the service, was put in charge of the Kodiak Island and Cook's Inlet trading posts; he was also appointed one of the board of directors of the Colonies. Shelikoff's first vessel, the *Ivan Predecha*, was wrecked on St. Paul Island during the summer of 1791. He visited the island of Kodiak and reported that it had a population of fifty thousand; this no doubt was done to enhance the supposed value of his discoveries. The first Russian settlement on the island was made at Three Saints Bay, on the west side of Sitkalidak Strait. Today only a few crumbling ruins remain to mark the site of that settlement. In 1792, Eustratus Ivanovich Delareff, chief director of the Russian Colonies, resigned his position to Baranoff, who decided to transfer the settlement at Three Saints Bay to the northern end of the island, as a better and more central location for the distribution of supplies. The new settlement was named St. Paul, and was situated on Pavlor Bay, the present site of Kodiak village. The great warehouse, built of logs, and other ancient buildings still remain. A company of Russians, under Stephan Zaikoff and Lebideff Lastochin, had already estab-

lished themselves in Cook Inlet and Bristol Bay, claiming that their territory was not embraced in the grant to the Shelikoff Company. Such, in brief, was the early history of the Kodiak and Cook Inlet Russian settlements when Vancouver, in 1794, made the following record: "On the evening of the 5th of April with most of our sails clewed up, we anchored within four or five miles of the eastern coast of Kodiak, where we remained stationary in good soundings nearly four hours." Neither Vancouver or any of his associates visited Kodiak Island.

Mrs. Higginson in her *Alaska* says: "The Greek Russian church at Kodiak shines white and attractive against the green background of the hill. It is surrounded by a white fence, and is shaded by trees." That church was destroyed by fire; also a second one built on the foundation of the first. A third one was built on the same foundation; I visited this one. Before doing so I visited the residence of the priest. I was hospitably received by his wife, who informed me that he was absent on a visit to Woody Island. She called the janitor of the church, gave him the keys to it, and directed him to conduct me through the church, and having received a tip of fifty cents, he very promptly and satisfactorily did what he had been directed to do. The present frame church building is a very plain one, both inside and outside, and has the appearance of being an old one; I was told that it was built about thirty years ago. In the rear of the church are some graves in which are buried the remains of some of the faithful members of the church. The monk Naketa was buried here. On the grave stone of one of these graves was the inscription, "In memory of Rev. Father Peter and Mary Kasheraraoff." This

and the reception I was given by the wife of the priest called my attention to the fact that priests of the Greek church are permitted to marry. A Greek priest, however, is not allowed to marry a second wife.

Mount Katmai is located near the coast of the mainland west of Kodiak Island. The Katmai valley is thirty-two miles long, about two miles wide, and embraces an area of about seventy square miles. The eruption of the mountain occurred in June, 1912, at six o'clock in the evening, and the ash covered the entire group of Kodiak and Afognak islands; at Kodiak village it was nine inches deep. Mr. Pestriakoff told me that ash covered Kodiak in the shape of a black and reddish cloud, and that utter darkness enveloped the village for two days. It was almost impossible to breathe, and the entire population would have suffocated but for the timely assistance of a vessel that was then at anchor in the harbor. They lost the benefit of their gardens, and all of the cattle had to be removed, but since then have been returned. I saw these cattle, of the Galloway breed, grazing on the mountain side when I was there in 1914. Ash fell as far away as Juneau, Ketchikan, and the Yukon valley, distant respectively six hundred, seven hundred and fifty, and nine hundred miles. Shortly after the eruption, I was at Skagway, where I saw ash that had been carried to and deposited at that place. While at Kodiak I gathered a pint can full of the ash and brought it home with me, and I still have it. It is of a grayish color and is the size and consistency of gunpowder. Mr. Prestriakoff told me that he was of the opinion that the ash was going to be helpful rather than detrimental to the island, he being of the opinion that it would act as a fertilizer. He took me into his garden and showed the

effect it was having on his potato vines, from which he expected to have a good crop; they certainly did look very promising. The National Geographic Society has sent expeditions under the direction of Dr. Robert Griggs of Ohio State University to examine, study, and report to the Society the results of his investigations. Among other facts Dr. Griggs reported that Katmai crater is the largest in the world, it having a circumference of nine miles and a depth of two thousand, six hundred feet; that if every structure in New York, Brooklyn, the Bronx, and other boroughs of greater New York were gathered together and deposited in the crater, the hole that remained would still be more than twice as large as the crater of Kilauea; that such an eruption of Vesuvius would bury Naples under fifteen feet of ash, and Rome would be covered a foot deep; that the sound would be heard at Paris; that dust from the crater would fall in Brussels and Berlin, and the fumes would be noticeable far beyond Christiana, Norway. In his report in the *National Geographic Magazine* for May, 1917, he relates the experience of himself and his party as they made their way back and forth, plunging through suffocating vapors, trapping gasses for chemical analysis, making soundings, mapping the course of the valley, and studying the geology of what he calls "The most amazing example of her processes which Nature has yet revealed to twentieth century man—one of Vulcan's melting pots from which the earth was created." In the valley he found that there were thousands of vents in constant action, and that some of them ascended more than five thousand feet into the air when conditions were good, and that when the valley was wind-swept they crept along the ground for two or three miles;



KENAI NATIVE CACHE, COOK INLET, ALASKA

hence he named it, "The Valley of Ten Thousand Smokes." He is emphatic in his belief that there is nothing known to mankind that can be compared to this valley. In a tent less than two miles from one of the huge clouds of steam he slept at night, and on one of the large flat stones outside, so hot that it was a natural stove, the members of the expedition cooked their food. Dr. Griggs is of the opinion that Mount Katmai, with its enormous number of vents, probably will not again be active in thousands of years.

During my voyage to Kodiak and return I was served at the table by a Canadian whose name was John. He was very attentive to my wants, and as he was an old seaman I obtained much information from him. I was standing on the bow of our vessel as it turned away from Kodiak. John came to me and said, "Have you seen all that you wanted to see on this voyage?" I answered, "No." "What is it that you want to see that you have not seen?" he inquired. I answered, "John, I want to see and be in a real storm at sea – I have never been in one." He faced forward and looking at the sky said, "I think we will be in one in Prince William Sound, and you will have your wish gratified." Sure enough he was right. The storm overtook us as we were going out of the sound and approaching Cape Hinchinbrook, and it was a real storm. Dense, dark clouds gathered and lowered, and the wind blew ferociously from all directions, the waves rolled high and rushed over the deck; the sea fowls flew in mad confusion, yet seemingly enjoying the storm; our vessel rode the waves – now up and now down; those on the upper deck, excepting some of the officers and myself, hustled below. Again, I found that I was a good sailor, and so truly enjoyed a real storm at sea.

Fur-Bearing Animals of the North Pacific Coast and Waters

On Friday, May 16, Vancouver's little fleet was at anchor at the mouth of Cook Inlet and the weather was delightfully serene and pleasant. It was ushered in with a sight little expected by Vancouver. A great fleet of skin canoes, each carrying two men only, were about the Discovery, and, with those who at the same time were visiting the Chatham, it was computed there were not less than four hundred Indians present. They were almost all grown men, so that the tribe to which they belonged must have been a very considerable one. They very willingly entered into trade, and bartered away their hunting and fishing implements, lines and thread, which were extremely neat and well made from the sinews of animals, and bags ingeniously decorated with needle work, wrought on the thin membrane of the intestines of the whale. These articles, with some fish, and some well executed models of canoes with all their appendages, constituted the articles of commerce with these people, as well as with the Indians in Cook Inlet; for excepting the furs given to Vancouver by Chatidola's party, not an article of this description had been offered for sale, or even seen in the possession of the natives, and this was the case on Vancouver's former visit to this country. The clothing of these natives now chiefly consisted of garments made from the skins of birds and quadrupeds of not the least value. This

humble fashion had most likely been introduced by the Russians for the purpose of increasing the number of the skins of the sea otter, foxes, marten, ermine, and such other fur-bearing animals which they found to be worth exporting. Perhaps no better place than here will occur for a study and consideration of the fur-bearing animals of the North Pacific coast and its waters.

The lynx, a carnivorous animal, is usually classified with the cats but it differs from that genus in wanting the smaller premolar next to the canine teeth. There are certain differences in the skull also which justify a change from the genus *Felis* to that of the *Lynx*. Of the lynxes there are several species: The Canada lynx, *L. canadensis* (Kerr) is the largest American species. It is about the size of a setter dog. Its general color is gray above with darker shades and lighter color beneath. It is densely furred in the winter, but in summer the fur is short and of a rufous color. It is remarkable for its gait, going by successive leaps with its back arched. It lives in the deepest woods and rarely approaches the habitations of man. It is most abundant in the Arctic regions, its thick fur enabling it to resist the greatest cold.

They are found almost anywhere on the mainland of British Columbia but are most numerous in the northern interior; also, throughout the heavily wooded interior of Alaska, especially wherever rabbits are found. During the year ending November 15, 1914, 6930 skins were sold in Alaska for \$85,595.50, being an average price of \$12.35 per skin. They feed principally upon rabbits, but they will eat other small mammals such as squirrels, rats, mice, shrews, and the like; they also destroy many birds, especially of the ground

species. Sometimes they prowl about the pioneer's cabins in search of lambs, pigs, and poultry. The flesh of the lynx is eaten by the Indians, and its fur is prized by them for robes, muffs, collars, etc.

The wolf is a gaunt but strong animal, with a skulking gait, and an aspect marked with mingled ferocity, cunning, and cowardice. It belongs to the dog family; indeed, by some it is thought that the original dog was a wolf. There are several species of them, especially in America, but their habits and characteristics are very much the same.

The gray or timber wolf, *canis occidentalis* (Richardson) formerly ranged over every part of North America. They are very crafty in their mode of taking their prey. They are more or less abundant all over British Columbia, but are particularly numerous on Vancouver Island and along the northern coast—sufficiently so to be a menace to the deer in many places. They are large, probably the largest animals of the wolf family, and vary greatly in color from almost black to grizzly-gray and from brindled-brown to yellow. The provincial government pays a bounty of fifteen dollars for wolf and cougar scalps.

In southeastern Alaska they are abundant and are said to be on the increase; it is probable that few of the islands in that region are entirely free from them. They are very destructive of the deer, and are charged with the destruction of reindeer. They consume large quantities of salmon. They are considered common in the Cook Inlet region. During 1899, Mr. Cook of Hope, secured fourteen of them with poison; six of these were of the black phase. On the lower Yukon wolf skins are in demand by the Indians, who use them in making trimmings for their parkas and for robes.

The total number of wolf skins shipped from Alaska during the year ending November 15, 1914, was 44; they were sold for \$398.00, making an average price of \$9.00 per skin. The majority of these came from Nome, Ketchikan, and Wrangell.

The fox, a carnivorous animal, belongs to the *Vulpes* division of the *canidæ* family. It is distinguishable from the dog, wolf, and other animals of the genus by its low stature, pointed muzzle, shorter neck, slender limbs and long, bushy, symmetrical tail. It is a cleanly, shy, cunning, suspicious, unsociable animal and incapable of full domestication. It usually is concealed in the daytime in a burrow, and comes forth stealthily at night in search of its food, which consists of fruit, especially grapes, birds, squirrels, rats, moles, mice, fish, reptiles, and insects. Though very slender, it is very muscular and is capable of great speed. The breeding season in the North begins toward the end of February and gestation continues about sixty-five days. A female whelps once a year and gives birth to from four to eight young at a time.

There are many species of American foxes. Of these the common American red fox, *V. fulvous* (Desmarest) as its name indicates, is common in most parts of North America. They are very numerous in British Columbia and the Yukon country. Formerly they were quite plentiful on the hills and ranges surrounding the Tanana valley, and fairly abundant over most of the interior of Alaska. Their numbers have been much depleted in that region by the use of poison. The color of the fur of the true red fox is reddish white grizzled with gray on the lower back; throat and narrow line on the belly, white; back of ears and tips of hair on the tail, except the back, black; tail long, bushy,

tipped with white. According to B. W. Evermann, "wherever red foxes occur, black, silver and cross-foxes (all color phases of the red fox) are occasionally found." Their popular classification is as follows: Red fox, when red or yellow over sides and back; silver fox, when no red is present; and, cross or patch fox, when the sides and neck are red and the back, shoulders and hips are silver. This is an intermediate between silver and red.

The Alaska red fox, *V. alascensis* (Merriam) is very abundant on the Alaska Peninsula, and is fairly common in the adjacent regions to the northeast. The prevailing color of this fox is deep hazel, except where diluted by creamy white; it is most concentrated on the middle of the shoulders and on the upper side of the tail. The face, nose, and forehead have considerable admixture of white hairs, but the predominating rufous effect is much deeper than in *V. fulvous*.

The Kenai fox, *V. kenaiensis* (Merriam) is said to be the only one found in the Cook Inlet region. It is the largest fox known to America. Some attempts at "farming" these large foxes have been made, but so far have generally proved unsuccessful on account of the vicious habit the males have of injuring or devouring the young.

The Arctic fox, *V. lagopus* (Linnaeus) is found, as a rule, only in the extreme north. It is remarkable for the changes which its hair and fur exhibit. In the summer it is of a dusky ash color, but in the winter it turns white, and becomes fuller and thicker, even covering the soles of the feet. Straggling individuals of this fox are not infrequently found as far south as the north shore of Alaska. The foxes of the Pribilof Islands belong to this group and are considered as form-

ing a genus distinct from other foxes. The animals of these islands have become slightly differentiated by long insular isolation from their relatives inhabiting other parts of the earth, and bear the name *Alopex pribilofensis*. The so-called white and blue foxes are not a different species but merely represent two color phases of the same animal, the white being the winter coat of the normal phase, which in summer is characterized by a brown back and shoulders and tawny sides. The blue fox is the abnormal dark color phase, sooty gray in the summer, and bluish gray in the winter. This sooty phase is found practically throughout the range of the animal, at least in America. On the Pribilof Islands the sooty phase so outnumbers the ordinary phase as to be practically the normal state.

The history of foxes on the Pribilof Islands is interesting. What number of fox skins were taken off these islands by the Russians will never be known. Petroff (1883) states that 24,767 were taken from 1842 to 1860. From that date to 1867, the fox skins taken from the islands were not segregated from the returns of those taken from general Alaska sources, which were given by Petroff as 27,731. From 1870 to 1890, fox skins to the number of 4,380 on St. Paul and 20,412 on St. George, aggregating 25,111, were taken and shipped by the Alaska Commercial Company. From 1880 to 1910, 2,963 fox skins were taken on St. Paul and 13,641 on St. George, aggregating 16,604. The blue fox herds on the Pribilof Islands were managed by the United States government for the first time in the winter of 1910-11. The skins taken were shipped to London with the fur-seal skins and sold under the same auspices. The consignment consisted of 371 blue skins and 20 white skins. Some of the blue fox skins brought

\$85.00 apiece, and the average price was \$44.00. Statistics of the fur-trade of Alaska from 1786 to 1862 show that 555,537 fox skins were taken. During the year ending November 15, 1914, a total number of 23,782 were taken, valued at \$288,721.60, making an average price of \$12.44 per skin.

The weasel family, *Mustelidæ*, includes the weasels, martens, minks, skunks, otters, etc. These animals are, for the most part, quite small, and are blood-thirsty creatures. Generally they strike the neck of their victims just behind the ears, piercing the large blood-vessels, or drive their teeth into the skull. When they have once seized their prey, which may be a rabbit, rat, bird, or some reptile, they never let go their hold. Few animals equal them in agility. Because they have long, slender, flexible bodies, and creep stealthily upon their prey on their short legs, they have been sometimes called vermiform, wormlike carnivora. They are nocturnal in their habits, spending the day concealed in hollow trees, holes in walls, or in burrows, and come forth at night for their prey. They eat all sorts of small animals and birds, ranging in size from shrews and mice to squirrels and rabbits, and from chickadees to partridges, but they feed chiefly upon the smaller mammals and birds. Some of the most beautiful furs are obtained from this family, for instance, the sable. Some of them are exceedingly offensive. Ermine is the name given to several species of weasels of the genus *putorius*. The fur of these was formerly used in England to line robes of judges and magistrates, and hence was often referred to figuratively as emblematical of the purity which should belong to such persons.

The common weasel, *putorius steator*, exemplifies

the general shape of the whole family, of which it is the smallest. It inhabits the northern parts of both hemispheres. In the winter season it exchanges its brown color for a white livery, more or less pure. It is found throughout British Columbia, including Vancouver Island. It is also found throughout the whole wooded interior of Alaska; not only in the dense forests, but is also common about miners' and woodchoppers' cabins, woodpiles, and in rubbish heaps along the trails. The female is much smaller than the male. She makes her home under a pile of stumps or stones or in a hollow tree. The young are born in May while the female is still white or only changing. The males and females do not remain together, but separate soon after the rutting season is over and lead solitary lives most of the year. By the middle of October, most of the weasels have changed their brown summer pelage for the white winter coat and are then called ermine. In the spring brown hairs begin to appear early in April if the season be an open one; usually, however, the change does not begin until after the middle of April. By the middle or last of May, the change is complete, and the coat is brown once more. Because of the small size of the weasel and the small price brought for the skin, prior to 1912 trappers rarely made any special effort to trap it. After that, however, the price increased so rapidly that it became an animal worth while, and trappers have been paying more attention to it. For the year ending November 15, 1914, 6873 skins were taken in Alaska and sold for \$6,598.08, making an average value of 96 cents per skin.

The pine marten, *M. americans* (Turton) also called the American sable, is about seventeen inches long from the tip of the nose to the base of the tail, the tail

being ten inches long to the end of the hairs. Its general color is a rusty yellow, with a lighter head, almost whitish throat, and dark tints on back, varying according to season, latitude, and locality. It is a very shy, cunning, curious, and active animal that prefers the dense pine woods of northern latitudes. It is carnivorous and pursues its prey, which consists of birds, squirrels, and other small animals, into the tree-tops. It is more or less nocturnal in its habits, and prefers cold uninhabited regions. Its northern limit according to Richardson is sixty-five degrees north latitude where the trees are absent, and according to Audubon and Bachman, its southern limit is about forty degrees. East and west its range extends from the Atlantic to the Pacific.

The pine marten is one of the most valuable of the fur-bearing animals of Alaska. Being an animal of the forest it is rarely seen where there are no trees. The fur from it in different regions has distinctive peculiarities. An expert can usually tell the locality from which any particular bunch of skins come. The so-called black marten is a myth. The darkest are not black but a deep chocolate brown. There are a few very dark martens, a large number of dark brown, and a larger number that are pale in color, varying from light brown to golden yellow. Now and then a golden marten is found; these, however, are very rare and bring a high price. Marten skins vary perhaps more in color than any other fur and the pelts are therefore hard to match, which, of course, adds to the cost of well-matched skins. For such pelts trappers get from ten to forty dollars, depending upon the quality. Two perfectly matched dark marten skins caught in the winter of 1911 on Healy River brought the trapper \$40, and they were soon re-sold for \$110. During the year

ending November 15, 1914, 6497 skins were taken in Alaska and sold for \$49,119.32, being an average price of \$7.56 per skin.

The fur of the marten in the interior regions of Alaska becomes prime early in November. It continues to improve, growing longer and heavier. By the middle of the month, it is quite heavy and the skins are in good condition. The best pelts, however, are not obtained until December and the first half of January, when the fur is heavier, softer, and more glossy than at any other time. Very few skins, however, can be taken at this season because of the unfavorable climatic conditions. White men sometimes venture out and do some trapping, but the Indians seldom go out before February or March.

The habits of the marten are peculiar. They do not follow the small streams and ponds as do the mink and some other species, but prefer the higher land covered with heavy spruce and pine forests. In such regions it is almost the only fur animal to be found, and as a result the marten trapper is a specialist who traps for it alone. It prefers to make its nest in holes high up in some old tree, and finds the nests of the largest woodpeckers perfectly suited to its use. Having established a home in a woodpecker's or squirrel's hole, it likes to watch whatever is going on in the woods beneath it, with just its nose poked out into the air, ready to slip back out of sight if danger threatens. Its nest is made of moss and leaves in the bottom of the cavity. Although in the wild state apparently quite ferocious and untamable, it is, as a matter of fact, more easily domesticated than almost any other of the fur-bearing animals, and it is believed could be handled with commercial success on a fur farm.

The fisher marten, *M. pennanti* (Erxleben) is found in small numbers, more or less all over the mountains of British Columbia. This is one of the wildest of all wild animals. It is by far the largest of the martens. Its favorite hunting grounds are gloomy hemlock and spruce-covered hills and ranges. They are as much at home in the tree-tops as are the pine martens, and climb to where the partridges roost, and catch them in their sleep, but hare's flesh is their regular diet. They sleep during the day in hollow trees or logs, preferring a good sized cavity high up among the branches.

The Pacific marten, *M. caurina*, is found on both the mainland and islands of British Columbia. The best skins, however, are obtained from southeastern Alaska.

The mink, a small fur-bearing animal belonging to the genus *Putorius*, is found in the northern parts of America. It has one molar tooth less on each side above and below than the martens, and is therefore more carnivorous; its size is smaller, and form more slender; its color is nearly uniform; its feet much webbed, and their pads large and naked, with the intervals not occupied with hairs.

The common American mink, *P. vison* (Schreber) varies in length, from nose to base of tail, thirteen to eighteen inches, the tail being from eight to ten inches long. The general color is dark brownish, the tail nearly black, the chin white, but not the edge of the upper jaw. Some specimens are lighter, even to yellowish brown. The body is long and vermiform with long neck; short and stout limbs, with five-toed feet armed with sharp claws; tail long and cylindrical, having on each side of the upper surface a glandular

cavity secreting a strong musky fluid; hence the generic name *Mustela*. The under fur is soft and downy, with larger and coarser hair intermingled; in a more southern locality, the coarser and stiffer is the fur. The mink feeds on small rodents, marsh birds, frogs, crawfish, and fish. It takes up its residence in the borders of ponds and small streams, especially near rapids and waterfalls. It is a swift swimmer and diver, and a good runner. Unlike the martens, it rarely climbs trees. In the north part of its range, the breeding season begins about the first of March while the snow is on the ground, and the young, five or six in number, are born about the end of April.

Mink are quite common in and about many of the clear-water streams of the interior of Alaska, and are, commercially speaking, the most important of the minor fur-bearing animals of the territory. During the year ending November 15, 1914, 35,623 skins were taken in Alaska and sold for \$158,878.58, making an average of \$4.46 per skin. The best region for them is that drained by the Porcupine and Chandler rivers, northwest, north, and northeast of Fort Yukon, and the Kutishna region south of the Tanana. The lower Yukon tundra is also good for them, and they are common on the tributaries of the Koyukuk. The skins from the interior of Alaska are usually dark chocolate in color; those from the tundra region are usually reddish brown. Albinos among mink are not uncommon.

The mink will wander along the banks of a stream or pond, explore every nook and corner, and all the little brooks and ditches emptying into the larger streams in search of small fish, of which it is partic-

ularly fond. It may be taken either on the land or in the water. An expert hunter usually prefers to take it on the land. He sets his trap on a projecting point of the bank, or in the water at places where the signs indicate that it comes for fishing; sometimes traps are set on fallen trees and on logs across small streams.

The Pacific mink, *Lutreola vison energumenos* (Bangs) is found more or less throughout British Columbia, but is most plentiful on the coast. Six specimens of this species were taken on Vancouver Island by the Alexander Expedition in 1910. Skins of these specimens compared with the mink from southeastern Alaska (*L. nesolestes*) taken at the same season of the year were appreciably paler and more reddish. The general body color was vandyke brown, darker on top of the head, the median line of the back, and the tip of the tail. The under fur was paler, about wood brown. On each specimen there were disconnected and somewhat variable patches of white on the chin, throat, breast, and abdomen. This species has been found to be moderately common in the Cook Inlet region.

A specimen of the island mink, *L. vison nesolestes*, a new sub-species, was collected by the 1907 Alexander Expedition to southeastern Alaska from Windfall Harbor, Admiralty Islands, Alaska.

The otters form an aberrant genus of the weasel family. They differ from the other genera in being aquatic, and in their food, for the most part, being taken from the water. Their paws are fitted for swimming, which they do with great celerity. Their fur is close, short, and fine, so that it may not interfere with their progress in the water, and they are provided with

a nictitating (winking) membrane which can be drawn over the eye for defense, it being transparent enough to allow them to see through it.

The American land otter, *Lutra canadensis* (Schreber) has a length of about four feet six inches, of which the tail is eighteen inches, and weighs from twenty to twenty-five pounds. Its nostrils are large and open; eyes very small and very far forward; neck long, and legs are short and stout. The color above is dark glossy brown, slightly lighter beneath, lower surface and sides of the head and neck dusky white. It is a rapid swimmer and an expert diver. As a rule, it makes a burrow for its home, in the banks of swift running streams, the entrance to which is in the water, and lines it with leaves and grasses. It is voracious, fish being its principal food. The female gives birth to a litter of two or three, between February and April, according to latitude. The parents are very fond of their offspring and defend them against all danger. When the young otters are large enough, the mother takes them into the water for their first swimming lesson. It is said that at first they are very afraid of the water and have to be carried into it by force. Otters have a very singular habit of sliding down wet and muddy banks or icy slopes, apparently for sport, of which the hunter takes advantage by setting traps at the foot of the slide.

The land otter is found in almost all parts of North America; its greater abundance, however, is in the northern part of its range. In British Columbia it is found more or less everywhere, but only in a few places in the north can it be considered as plentiful. Like the beaver it has been in danger of commercial extinction in Alaska. During the year ending Novem-

ber 15, 1914, only 1008 of them were taken in that territory. They were sold for \$10,785.60, making an average price of \$10.70 per skin. There are, however, several places in which it is still found in considerable numbers. It is common in the tundra about the lower Kuskowim, and is found in some numbers at the headwaters of the Tozitna, Melozitna, Nowitna, and Kuskowim. In southeastern Alaska, they are found generally, and are reported as maintaining their numbers. They are most abundant on the islands.

The sea otter, *Latax lutris* (Linnaeus) resembles a seal more than an otter. Its head is short and very broad; ears very small; nose with a naked muffle; toes of the fore feet very short, bound in a thickened membrane, densely haired and covering the claws, and the hind feet are far backwards, with their outer toes the longest. The length of the body of an adult is more than five feet, of which the tail is one foot. The color is chestnut brown, but black in the adult in the proper season; there is a grayish tint about the head and neck; the fur is exceedingly fine. Its food consists of fish, lobsters, and cephalopods. It produces on land or kelp, a single young one at a birth, about fifteen inches in length. H. H. Elliott says: "The sea otter mother sleeps in the water on her back, with her young clasped between her fore paws. The pup cannot live without its mother." It inhabits the waters of the North Pacific from Kamschatka, down on the American coast as far as Monterey. It is essentially a marine animal.

Carnivorous quadrupeds are divided into two classes, namely, digitigrade and plantigrade. The first named walk on their toes and the second on the soles of their feet. The bear belongs to the second class. It might well have been classed as carnivorous, for most of the

species live partly on insects and vegetable food; all of them are very fond of honey. Most of them have sharp claws and are expert climbers. They conceal themselves in cavities, holes and hollow trees, where they spend the winter in a state of torpidity. Of the family of *Ursidæ*, consisting of the bears, there is found on the Pacific coast and islands the following species and sub-species, namely, the black bear, *Ursus americanus*; Queen Charlotte black bear, *U. euarctos carlotte*; glacier bear, *U. emmonsii* (Dall); grizzly bear, *U. horribilis* (Ord); Alaska grizzly bear, *U. horribilis alascensis* (Merriam); white bear, *U. kermodei*; Sitka bear, *U. sitkensis* (Merriam); Yakutat bear, *U. dalli* (Merriam); Pavalof or Peninsula bear, *U. dalligys* (Merriam); Kidder's bear, *U. kidderi* (Merriam); Kodiak bear, *U. middendorf* (Merriam). Not all of these will be specially considered in this connection.

The black bear with a length of about five feet, because of its former abundance and general distribution throughout North America, may be said to be the typical species of the western continent. It is found with various shades of color from light brown to a glossy black. Those of a light brown sometimes are called "cinnamon bears." They are found throughout British Columbia but are most plentiful on the coast and Vancouver Island.

The young of the black bear are born after the old one has housed herself for the winter. Usually she gives birth to two, and when born they are very small. They draw their nourishment from the mother and become very fat and she becomes very lean and shaggy. The cubs remain with the mother, who is very fond of them and leads them through the woods, teaching

them everything she knows. In Yellowstone Park I saw many black and grizzly bears at the garbage piles and some of them in the forest. At one of the garbage piles I saw a mother black bear with her two cubs. We were told to keep at a distance because of her ugly disposition. She seemed to be in a bad humor, and it was interesting to see her cuff her cubs and send them up a tree until she had finished her breakfast. I noticed, however, that when the grizzlies came to the garbage pile, the black bears stood aside, and waited for their turn.

From Massett, Queen Charlotte Islands, British Columbia, Osgood obtained a skull of the Queen Charlotte black bear, *U. (Euaretos) carlottæ, sp. nov.* In describing it he says: "Its size was greater than *Ursus americanus*; skull more elongate; cranium less arched; teeth larger and heavier, particularly last molars; last upper molar with 'heel' quite elongate." He adds: "Seven perfect skulls of the Queen Charlotte black bear are in the Biological Survey collection, and although most of them are those of immature animals there is no difficulty in distinguishing any of them from mainland specimens. In comparison specimens from western British Columbia and Alaska have been used to represent *americanus*, which, so far as known at present, ranges from the Atlantic to the Pacific."

The grizzly bear ranges from the great plains west of the Missouri River, at the foot of the Rocky Mountains, through Upper California, northward along the Pacific coast to Alaska. "Horribilis" tells the story of its ferocious character; it is the most savage and powerful of all of the bears. Among the Indians it was formerly regarded as a great feat to kill one of them and he who did this was permitted to wear a necklace

of its claws as a decoration. It is also one of the most tenacious of life of all animals. One shot by the Lewis and Clark party, after receiving ten balls in his body, four of which passed through his lungs, and two through his heart, survived more than twenty minutes and swam half a mile before succumbing to his wounds.

The grizzly is a great rough brute with a maximum length of about seven feet; its snout is black and movable, the central furrow being distinct; its lips are partially extensile; its eyes are very small, having no third eyelid, and the irises being of a reddish brown; its ears are short and rounded, and the line of the forehead thence to the eyes is a little convex; its tail is short, and in the living animal hidden by the hair; its hair on the face is very short, but on the body, it is generally long, thickly set, and shaggy; in the adult the color is a mixture of brown, white, and black. The claws, especially those of the fore feet, are much more produced, and far more crooked; on the fore paws, the claws are rather slender but long, as well as crooked and sharp at the tips, the sharpness being rather that of a chisel though narrowed at the edges to a point; this structure gives the tips great additional strength and accounts for the severe gashing wounds which are inflicted by their strokes; their trenchant points form terrible lacerating instruments.

Black bears, as I have already stated, are found on most of the islands of British Columbia, but the grizzly bear is found on none of them. There are, however, but few places on the mainland of the province where there is not a chance of running across a grizzly. They vary a great deal in size, color, and shape of claws, and also in their habits, according to local conditions, and are known by several different names, but

that they are entitled to be classified as different species is doubtful. In the Selkirks and Rockies they are of medium size, are generally of the silver-tip color when in full pelage, and are known as "silver-tips;" they also have long blunt claws, and their main habitat is fairly high in the mountains, seldom being seen in the valleys, except in the north, where they come down to fish for salmon. They appear to increase in size as the coast is approached, and become of brown color, until, actually on the coast, they have a strong resemblance to the northern brown bear of the Alaska coast. The coast grizzlies also differ from those of the interior in that they live a great deal in the valleys, and are occasionally to be met with on the salt water beaches. The valleys of the Nass, the Stikine, and the Skeena rivers are very good hunting grounds for them, as also are most of the long inlets of the province. The Alaska grizzly is found in the Norton Sound District of Alaska, and is distinguished by a larger skull and other cranial and dental peculiarities.

The brown bears are restricted to Alaska and the adjacent islands. There are found the Sitka bear in the Sitka coast region; the Yakutat bear in the Yakutat Bay region; the Pavalof or Peninsula bear in the Pavalof Bay region; Kidder's bear on the Alaska Peninsula, and the Kodiak bear on Kodiak Island. These last are enormous animals and present differences of structure from the black and grizzly bears. The Kodiak bear, the recognized type of the family, has a length of about ten feet. Formerly they were very abundant on Kodiak Island, but now are not very plentiful.

The Pavalof or Peninsula bear is the second largest of its family. For the following interesting facts con-

cerning it, I am indebted to Wilfred H. Osgood's account of it, in *North American Fauna*. He says that formerly they were abundant on the Alaska Peninsula, but, that the persistent hunting of them by the natives since the introduction of modern repeating rifles has reduced their numbers greatly. There are yet a good many of them in the vicinity of Lake Iliamna. Several old bear trails were found on the mountains near the head of Lake Clark. In following them he noticed a few "bear trees" with the bark torn off and the trunk scarred with claw marks. The highest scratches were found to be only seven feet and nine inches from the nearest place where a bear might stand, indicating that no very large individuals had passed that way. In all cases the trees scratched were white spruce.

In regard to the habits of the brown bears of Alaska he says that the season of their activity varies, but is usually from the latter part of March or early April to the early part of November. They are not particularly averse to snow, and their tracks are often seen in it, but the date of their retirements in fall and of their reappearance in spring depends upon the severity of the season, so that sometimes they may go in as early as October and not come out until April. Sometimes, when disturbed, they come out for a short while in midwinter. Their dens are chosen in rocky, remote places in the mountains, to which they are some times tracked by the natives, both with and without the aid of dogs. The young are always born before the female comes out of her winter quarters. The date of birth is ordinarily sometimes in January, doubtless varying considerably in individual cases, for during the summer cubs of different sizes may be seen on the same date. At birth the young are blind, naked, and help-

less; they vary in number from one to four, but two is the usual number. They follow the mother until the end of their second summer, when they are often nearly as large as she. The cubs are mischievous and playful and receive many a stern reproving cuff from their mother.

The brown bears avail themselves of everything the country affords in the way of food, including fish, flesh, fruit, roots, and grass. When they first come out in the spring, they eat young grass, herbage, and roots, and if they are near the coast, take a little kelp. In securing and handling their food they display much deftness and a control of their fore claws seldom accredited to their kind. In the spring they also enjoy, now and then, a meal on a ground squirrel (*Citellus*). Hunting these squirrels and digging them out seems to be a combination of business and pleasure for the bears, and the antics they go through are very interesting to the onlooker. The bear is usually so intent on the game that he himself is easily approached. Sometimes he slips along a hillside and tries to catch the squirrel by a sudden pounce, but this usually fails. When the squirrel dodges into its near-by burrow, new tactics are adopted. The bear immediately begins to dig, throwing out big turfs and clods at each stroke, using the left hand chiefly and watching the hole intently all the time. While this is going on, the squirrel sometimes runs out between the legs of the bear and makes for another hole. Possibly he is caught by a quick pounce. If he escapes, excavations begin immediately at the new hole. The bear digs a few strokes, and then stops to poke his nose into the hole and sniff. Finally his efforts are successful and the luckless squirrel is devoured.

As soon as the salmon begin to enter the streams, bruin makes fishing his chief business. He varies his diet somewhat, however, and occasionally leaves the streams for the mountain sides, but in a short time returns again to the fish. The fish in large numbers usually ascend the streams for the entire summer, and the supply is practically unlimited. In fishing the bears do not get all their prey in shallow water or on bars and riffles in small streams, as is generally supposed, but often go into comparatively deep water in large streams. Practically all the fishing is done at night or very early in the morning; their habits in this respect have doubtless changed in recent decades, since they have been hunted so much. It is most interesting to watch a mother bear with cubs. The cubs do not attempt to fish, but stay on the bank and receive contributions. The mother stands upright and wades into the water, even up to her neck, going very slowly with the current, watching the water and scarcely making a ripple in it. She holds her arms down at her sides with her hands spread, and when she feels a salmon coming up against her, clutches it with her claws and throws it out on the bank to the expectant cubs. Often she stands perfectly motionless for a considerable time, and when she moves, it is with extreme deliberation and caution. After supplying the cubs she puts the next fish in her mouth and comes ashore to eat it. If salmon are plentiful or easily obtained, the two sides of a fish are all that she will eat; sometimes she even scorns those and fastidiously crunches the head and leaves the rest. The gills are never eaten. The cubs, however, are not so particular, but chew their portions haphazard. In case they have any difficulties among themselves in apportioning the tidbits, they are promptly

cuffed by their mother. When fishing in shallow water, the bear walks slowly on all fours as silently as possible, and when a fish appears in a riffle deals it a sharp blow on the head.

In the fall, towards the end of the salmon run, when fishing becomes unprofitable, most of the bears retire to the hills, where they feed on berries and put on fat during the last few weeks preceding hibernation. The black crowberry (*empertrum nigrum*) is eaten in great quantities, and various species of *vaccinium* which abound are also taken.

In moving up and down the mountains the bears usually follow the ridges, as shown by their trails, which often indicate years of use. These old trails do not resemble ordinary game trails, which are merely paths, but each consists of a succession of distinct, irregularly oblong indentations in the turf, alternating from side to side, a sort of composite of the prints that have been made by many feet during many seasons. These depressions become nearly eighteen inches in length by ten inches in width and from two to four inches in depth. They are often quite conspicuous and can be seen for a considerable distance.

The two types of coloration commonly shown by these species of bears, the dark brown and the light brown or even creamy, do not seem to be anything more than color phases or individual variations. Numbers of skins were examined by him, and, in all lots exceeding a half dozen, both phases, or modifications of both, were found to be represented. Moreover, the natives told him that they had often seen a light and a dark cub following the same mother. A certain amount of this difference in color among the adults might be seasonal, but it did not seem probable to him that it was

entirely so, for skins of both general types were frequently seen in the same apparent condition, and were alleged to have been secured at the same season.

The geographic distribution of the various forms of the Alaska brown bears is still imperfectly known. Even the range of the group as a whole is not thoroughly understood owing to the impossibility of distinguishing them from grizzlies in reports which come from localities not represented by specimens. The range of the Pavalof or Peninsula bear extends westward at least from Cook Inlet to and including Unimak Island; large bears are found also on Nunivak Island and on the coast of Bering Sea from Bristol Bay northward, and probably they range over much of the northern and western part of Alaska. To what extent the group ranges into the interior of the territory is not known.

Osgood does not list or give any account of the glacier bear. True and Cram say that it has a length of four feet; that its general color resembles that of the silver fox; and, that this curious and little-known animal is an inhabitant of the St. Elias Alps, frequenting the edges of the glaciers. Its fur is remarkably soft, with a rich under-fur of bluish-black shade. It is known to fur-dealers by the name of blue bear, and is said to be shy and less fierce than other species.

During the year ending November 15, 1914, 663 black bears were taken in Alaska and sold for \$8,333.91, making an average of \$12.57 per skin; 32 brown bears, for \$288.00 making an average of \$9.00 per skin; and 3 glacier bears for \$67.50, making an average of \$22.50.

The raccoon, *Procyon lotor* (Linneaus) is about the size of the fox, and in form resembles that animal. Its general color is gray or yellowish at the base of the hair, dusky or black at the tips; dark on the back; face

whitish, with a black area on each cheek surrounding the eye; feet black; tail very bushy, grayish white, strongly ringed with black. By systemists it has been classified as a carnivorous animal. Its food, however, shows it to be an omnivorous animal for it not only eats small quadrupeds, birds, reptiles, fishes, insects, and eggs, but also nuts, cherries, berries, wild grapes, and other vegetables. It does much damage to green corn.

It is a night prowler, and when on the ground prowls about wet places from choice, and the evidence of its prowling may be seen by the imprint of its tracks along the borders of swamps and small streams. In pursuit of food it often rifles bee trees, and digs up bumblebee and hornets' nests. Not infrequently it robs hen-roosts. The young of the raccoon, five or six, are born in April or May and remain under the care and protection of their parents during the first season. On the arrival of cold weather old and young curl themselves together in a hollow tree, and spend most of the winter in a more or less lethargic condition.

The Pacific coon, *P. psora pacifica* (Merriam) has been found and is thought to be of fairly common occurrence on Vancouver Island. These raccoons are very dark colored, though not apparently more so than specimens from the northwest coast of California. The dark tail rings are very broad and black, and the tail is extensively black-tipped.

The wolverine, *Gulo luscus*, a carnivorous animal, is described as being heavy and bear-like; hair long and shaggy; general color blackish-brown, lighter on top and sides of the head; feet black; pale yellowish-white band from the middle of the body on each side, widening out on the flanks and going over the basal portion

of the tail. It belongs to the Arctic regions of both continents. In British Columbia they are principally confined to the mainland; a few of them, however, have been taken on the higher mountains of Vancouver Island. They are found sparingly throughout the interior of Alaska, and along the Alaska range. Though it prefers a high, wild, rocky country, it is sometimes found in more open regions. It rarely catches or kills large live animals, except perhaps young moose and caribou. It feeds readily and ravenously on any animal it finds dead; hence, it is sometimes called the "animal vulture." It will rob the native caches of their supply of meat and fish and cunningly steals the bait from the hunter's traps and any animal which it finds caught in them. It will steal anything whether of food value or not. It is such a greedy animal that its capture is usually not difficult. Sometimes, however, it shows much cunning, often eluding the trappers for an entire winter. Because of the harm it does in destroying the trapper's catch, the general feeling in Alaska is that it should not be protected. The pelt possesses considerable value. During the year ending November 15, 1914, 136 were taken in Alaska and sold for \$1,555.84, making an average of \$11.44 per skin.

A trapper told me as we left Valdez, September 27, 1914, that an Indian had brought to that city a freak wolverine skin, which was red along the back and black on the sides, and sold it for \$25.00. The purchaser was offered and refused to take \$50.00 for it.

The Yukon natives, who value the skins of the wolverine for trimmings for their clothing, tell many stories of their skill and cunning in discovering caches of provisions. On the Alaska Peninsula they are rather common. There the traders take advantage of the

natives' fondness for their coarse fur, and never ship the skins out of the country but resell them to the natives at high prices. A single skin obtained from a native in urgent need of provisions for \$2.00 to \$5.00 in trade, is sometimes cut into sections or strips and bartered piece meal for furs to the value of as much as \$30.00.

The squirrels, beavers, and hares, are members of the rodentia, which is composed of eight families. The peculiarity of this family is their gnawing teeth. These are in front, two on each side. The front covering of these teeth is enamel, and the rear portion or main body of them is ivory which is not as hard as the enamel. The effect of this arrangement is that as the teeth are brought together in gnawing, the enamel does not wear away as fast as the ivory. The thin enamel, therefore, always presents a sharp chiseling or cutting edge above the level of the ivory. No other class of animals has this peculiarity. These teeth are used for different purposes. For instance, the squirrels use them for cutting twigs for their nests, and the shells of nuts so that they can get at the kernels for food; beavers use them in cutting down trees, and, when down, into lengths for the building of their dams, also to take off the bark of trees and their limbs for food; and, the hares use them in barking small trees and shrubs, and cutting twigs, grass, and other vegetables for their food and nests.

The peculiar characteristic of the squirrel family is the bushiness of its tail. This, when spread out, affords some assistance in the leaping of these arboreal animals, both guiding and holding them up.

The Hudson Bay red squirrel, *Sciurus hudsonicus* (Erxleben) also known as chickaree, is the only species of the larger squirrels found on the Pacific coast. It

is described as having in winter back and upper side of tail bright chestnut, sides olive gray, their hairs banded with black; under parts grayish white; in summer no distinct rufous area in the back, and lower parts pure white with a black stripe on each side, separating the colors of the upper and lower parts. Length about one foot.

The food of this squirrel consists principally of pine, hemlock, and spruce cones. As early as July, while the young squirrels have still to be looked after, the parents begin cutting the green cones and burying them, to be dug up in the winter and early spring and opened for the seeds they contain. The quantity of cones they consume is surprising. At the base of a tree in which a red squirrel has its nest there frequently may be seen a pile of husked cones a foot or two high and five or six feet in diameter.

Their nests are usually built of moss and sometimes lined with feathers. They are globular in form and placed on a branch ten to twenty feet above the ground. Several nests often occur in one tree. They are accused of robbing birds nests and killing young birds. This is probably true, for the bones and feathers of birds are often found in their kitchen-middens.

Red squirrels are very abundant in practically all of the forested parts of Alaska. During the year ending November 15, 1914, 167 skins were sold in Alaska for \$8.35, making an average of 5 cents per skin. They have been observed exceedingly abundant in the spruce forests along the Fairbanks trail. They are also very numerous in all of the forests about Cook Inlet and Prince William Sound.

The muskrat, *Fiber zibethicus* (Linneaus) is strictly an American rodent, and the only species of its genus.

There are several sub-species of it. It is also called musk beaver and muskquash, the latter being the Indian name for it. Its specific name is derived from the musk found on the old males in the summer time, and contained in two flat oval sacs an inch or more in length, situated between the legs beneath and laid bare when the skin is stripped off. It is about two feet long, body rat-like, head compressed, neck short, eyes and ears very small, the latter having no special arrangement to exclude the water, its dense fur being sufficient for that purpose. Above it is of a dark brown color; beneath a dull white with white on breast. Its fur is a rich, shiny brown, with pale silky under fur like that of a beaver, only shorter and not so dense. It is well known for its aquatic habits. Its favorite haunt is a grassy marsh or bank of a lake or sluggish stream. Nocturnal in habit, it is occasionally seen in day time swimming in a stream or diving into its hole. It is an excellent swimmer. It gives birth to two or three litters during the open season of the year. These are raised, not in their cabins or lodges built in the water, but in their houses high up in the bank.

The muskrat is found from the Atlantic to the Pacific, and from the Rio Grande to Arctic America. It is found almost everywhere in British Columbia, but is most numerous at the mouth of the Fraser River. It is not very common on the islands of southeastern and central Alaska. They seem to be increasing in the Yukon valley. They are not known to occur about the Turnagain Arm of Cook Inlet, but are rather common about the small peat bogs near Tyonek. They are common throughout the Alaska Peninsula. During the year ending November 15, 1914, 101,202 skins were shipped from Alaska and sold for \$33,396.66,

making an average of 33 cents per skin. In addition to this the natives of the Yukon valley used many skins in bartering with other tribes who use them in making clothing, blankets, robes, and small articles to be sold to tourists. The northwest muskrat, *P. spatalatus* (Osgood) is very common in suitable localities throughout the Alaska Peninsula region. The conditions are peculiarly favorable for them in the wide expanse of the grassy swamp just above the mouth of the Chulitna River.

The family *Castoridae* is composed of the beavers, our largest gnawing animals. Of these the Canadian beaver, *C. canadensis* (Kuhl) is the type species. It is distinguished from all other rodents by its flat and scaly tail, which is ten to twelve inches long. It has a length from tip of nose to tip of tail of about forty-five inches. Its body is thick and heavy; head compressed; nose blunt; ears short; front feet small, hind feet large; both fore and hind feet are four toed; the hind feet are webbed and their second toes have two claws; fur remarkably close and soft, and interspersed with long bristly hairs. Its body is of dark bay or brownish color, tipped with chestnut-colored hairs. It is amphibious and, like the seal, can close its ears and nostrils when it dives into the water. It is an expert swimmer.

Beavers dam up small streams and build their thatched lodges in ponds thus made. They use much intelligence in the selection of the place where the dam is to be constructed. Having made a selection, they proceed to cut down trees with which to construct the dam. In doing this with their teeth, they gnaw deep parallel grooves around the trunk of the tree and then rip out the wood in large chips between the grooves.

This process is repeated until the tree falls. The trunk is then cut into shorter logs. These and the limbs of the tree are dragged to the stream and floated down it to the place where the dam is to be constructed. The dam is so constructed, that the water will flow over it evenly its entire length. When it has been constructed and the pond made, they proceed to construct their lodges.

These are roughly built with sticks and brush and plastered on the outside with sods and mud. When finished, they have a cone shape. The entrances to the lodge are in the water and below the ice. They spend their winter in these lodges. The tail is not used, as was formerly supposed, as a trowel in the construction of their lodges. The beaver carries its mud material to the lodge between its fore paws and the body and then arranges it with the fore feet. The tail is sometimes used as a prop when a beaver stands erect; also, to give alarm to its fellow creatures by flapping or popping the water. In the breeding season they do not live in their lodges but go ashore, and each female finds a secluded place for herself. Each produces from two to five young at a litter. The food of the beaver consists of the bark of the aspen, poplar, birch, alder and willow, and roots of various water plants.

Formerly the range of the Canadian beaver extended over the northern part of North America. It is now nearly extinct except in the north and northwest. It is found everywhere in British Columbia, where it is protected by law, both on the mainland and the islands. With the exception of the belt of barren coast country bordering the Arctic, it is found all over Alaska.

In southeastern Alaska beavers have increased rapidly since provision was made for their protection. Not

only have the old colonies been augmented, but new ones have been established, with the result that lakes and creeks formerly unoccupied are now inhabited by them. They are also becoming quite plentiful in certain parts of the interior, especially in the lower Yukon region.

The family *Leporidae* is composed of the rabbits and hares. The interchangeable and unwarranted use of the words "rabbit" and "hare" has been the cause of much confusion in the popular mind as to just what constitutes the difference. The rabbit is smaller than the hare, but is like it in form. It lives in a burrow, while the hare lives in a sort of nest which it constructs from grass. Both species have long legs and consequently jumping gait, large ears, and stumpy upturned tails. The forelegs are short and the bones so arranged that they cannot be turned inward and used as hands when they are feeding. They often raise the forepart of the body clear of the ground when reaching upward, but the forefeet hang useless during such operations. They differ from other rodents in having more than four sharp front teeth.

In North America there are many species and subspecies of the hares. Prominent among these is the American polar hare, *L. arcticus* (Ross) also known as the Arctic and white hare. This hare is found in North Baffin Land and the Arctic islands of North America, has a length of twenty-three inches and is described as having hair and fur, somewhat curly, white at all seasons except the tips of the ears which are blackish; a few blackish hairs scattered over the back in summer and the ears and face slightly gray. A little farther south these hares put on their brown fur for a few months in mid-summer and in most parts

of Canada and Alaska are six months white and six months brown.

Osgood, in 1902, found that the Alaska Arctic hare, *L. othus* (Merriam) sparingly inhabits the treeless region around Bristol Bay and out on the Alaska Peninsula probably for its entire length. He says that during 1903, A. G. Maddren secured a small series of skulls from Cold Bay, Kanatak, and the Becharof Lake region. Two specimens taken by McKay at Nushagah are recorded by True. He also found the Dall varying hare, *L. americanus dalli* (Merriam) to be common throughout the timbered regions of the Peninsula—especially so about Lake Clark and along the Chulitna River, where the conspicuous runways were encountered nearly every time they went ashore.

It is interesting to note in closing this chapter, that the minor furs shipped from Alaska in 1913, 1914, and 1915, not including the fur-seal skins nor the fox skins from the Pribilof Islands, were sold for an aggregate sum of \$1,728,288.51, a sum almost equal to one-fourth of the original cost of the territory.

Fur and Hair Seals of the North Pacific

Vancouver, in his account of his departure from Desolation Sound, says: "Numberless whales enjoyed the season, were playing about the ship in every direction, as were also several seals." The latter had been seen in great abundance in Desolation Sound, and in all the remote excursions of the boats, but they were so extremely watchful and shy that not one could be taken. Subsequently, in many places he made like mention of the great numbers of these met by him and his associates in the further prosecution of the survey of the Pacific.

As popularly applied the term "seal" includes a fairly large group of aquatic mammals, such as the sea lion and the fur and hair seals, all of which bear a superficial resemblance to each other. Strictly speaking, the last named are the only ones deserving of the name. Unlike the hair seal, the fur seal or sea bear, is able to progress readily on land and is able to hold its head erect. The group is at once distinguishable from other quadrupeds by the structure and arrangement of the limbs. The toes of all the feet are included almost to the end in a common integument converting them into broad fins; the bones are to a great extent within the skin of the trunk and the tips are armed with strong non-retractile claws; the hind feet are thrown out backward from the posterior part of the body nearly horizontally, a very short tail being between them, and are the principal agents in swimming and diving;

the fore paws when swimming are applied close to the body and are used only in turning about. Though formed on the general model of other mammals, they have many very interesting modifications which adapt them to an aquatic life. The body is cylindrical, tapering gradually backward; the head is small and rounded and the neck short, the skull is thin, which renders their head light in the water; the face short and broad; zygomatic arches perfect and strong; anterior nasal opening not terminal and in some directions almost vertical for facilitating respiration when the animal comes to the surface. The mouth is thick, lips fleshy, with many long, knotted, and exceedingly bristly whiskers. The skin has an under woolly down over which is a covering of long, smooth, and shining hairs, shedding water by an oily secretion and offering no resistance in swimming; between the skin and muscles is a layer of fat giving that plumpness to the body expressed by the common saying "as fat as a seal."

The only important strongholds of the diminishing northern fur seal today are the Commander and Pribilof islands in the Bering Sea. The species established on the Commander Islands is *Callorhinus ursinus*, while that breeding in the Pribilofs is *Callorhinus alascanus*. Although the two species breed upon islands lying in the same latitude and less than one thousand miles apart, there is no comingling. The former migrates southwestward along the Asiatic coast, while the latter migrates southeastward along the American coast into the Pacific Ocean. Practically all the individuals of this herd during some part of the season from May until December make the Pribilof Islands their home. The winter and early spring months are spent at sea. The migration route in gen-

eral is southward to the passes of the Aleutian Islands, then eastward and southeastward along the coast of Alaska, British Columbia, and the United States to the latitude of southern California. The adult males remain farthest north, wintering south of the Aleutian chain and in the Gulf of Alaska. The younger males go somewhat farther and the females the farthest of all. Returning from their winter resort, the seals reach the islands in general according to their age, the older animals first and the youngest last. Shortly after her arrival each cow gives birth to a pup, and after a sojourn of perhaps two weeks, during which time she is served by the bull, she puts out to sea on the first of several journeys in search of food.

The Alaska fur seal, *Callorhinus alascanus*, with a few allied species is remarkable among large animals for its highly gregarious and polygamous nature and its habit of performing a long annual migration. As already stated, it comes to land only in summer for the purpose of breeding and rearing its young; the remainder of the year is spent entirely at sea. It is an animal of exceedingly strong instincts and relatively small intelligence. The disparity in size between the sexes is very great, the adult male being nearly or quite five times as heavy as the female. Moreover, the male matures more slowly than the female and thus it results that seals of different ages and sexes are different in appearance and to some extent in habit. The names by which the different ages and classes of seals have come to be known, therefore, are somewhat peculiar. The breeding males are "bulls," the females are "cows," while the young are "pups." The males just approaching full maturity are called "half bulls," while the younger males are termed "bachelors." The breeding

ground is a "rookery," the place of breeding a "harem," and the place resorted to by the bachelors is a "hauling ground."

The so-called classes of seals are the natural divisions which are made according to age and sex. For practical purposes there are seven classes of male seals and four classes of females. The classes of males are the pups, the yearlings, the two-year-old bachelors, the three-year-old bachelors, the four-year-old bachelors, the five and six-year olds or half bulls, and the bulls or males of seven years and over. The classes of females are the pups, the yearlings, the virgin cows or two-year-olds, and the bearing cows or cows of three years and over. The distinction of these various classes is a matter of great importance in the study of the seals and in the practical management of the herd. It is especially important to distinguish the bachelors of two, three, and four years, since these are the classes most similar in general appearance and the ones from which quotas and reserves must be taken. The other classes are mostly so easily distinguished as to require no special notice.

Early in May, the adult males or bulls begin to appear at the rookeries on the Pribilof Islands. On reaching them the old bulls take their places on the rookery grounds, in many cases, perhaps in most, choosing the same spot occupied in former years. They retain the place selected throughout the entire season without eating, and become much emaciated. Once the place is chosen they can scarcely be forced by any means to forsake it, and they display the most extraordinary courage and persistence in fighting for and maintaining their positions against the assaults of their rivals or the efforts of man. Shortly after the first of

June, the females of three years and over begin to arrive. Each is pregnant and impelled by her condition to seek a place to give birth to her pup. On arrival they at once land and join a bull. The arriving cows show a tendency to join the larger groups and consequently there is an uneven growth, some bulls securing large harems early in the season, while others nearby, apparently equally strong and vigorous, may still have no cows. Those unable to secure harems are known as idle bulls. In general, the stationed bulls spend much of their time in sleeping, but as the height of the season approaches and cows come in heat in larger numbers the bulls become continuously alert and active. The large harems are clearly due more to advantage of position than to the fighting prowess of the bulls in charge of them. The number of cows to a harem vary greatly, frequently being more than fifty and occasionally exceeding one hundred, while in many cases it is very small, ranging from two to a dozen; thirty is about an average number.

Each female bears one pup and only one, and of the total number born approximately half are males and half females. The weight of the pup at birth is about twelve pounds. Within a few days after giving birth the female is impregnated; it therefore follows that the period of gestation is a few days short of one year. In the interval she nurses her pup, but otherwise shows comparatively little parental solicitude. After impregnation the mother seal, being free to go and come, takes the first of a series of journeys to sea for the purpose of feeding, going from fifty to two hundred miles or more, and, after gorging with fish, remains in the water until digestion has taken place. While the mothers are at sea the pups form small "pods" by them-

selves outside the harems. On returning each of the cows finds her pup among the thousands which now throng the rookeries, and stays with it a short time, the pup partaking freely of the abundant store of milk. These journeys to and from the feeding grounds are made until November, when old and young leave the islands.

The decline in the number of pups born marks the ending of the breeding season. The old bulls, grown thin and relatively weak from their long fast and protracted harem service, leave the rookeries and after a short rest go to sea to feed and recuperate. Even before the bulls leave, during the last week in July, they relax the strict discipline which they have maintained earlier in the season and the cows come and go at will and idle bulls and eager young bachelors throng the grounds they dared not enter previously. After this time also the two-year-old virgin females come ashore for their first impregnation. After this "break-up" there is more or less mingling of all classes of seals. The great majority of the cows continue to frequent the breeding grounds and the bachelors mostly resort to the hauling grounds, but cows often wander among the bachelors, and bachelors play among the cows. During the first week in August, a few pups begin to play in the water and to make short excursions from shore. By the latter part of August, pups may be seen swimming and frolicking along the shore at considerable distance from the rookeries. They continue, however, to come ashore to nurse, and leave with the majority of the cows and bachelors in November. During August and later months, yearlings are frequently seen playing among the pups.

The seal fisheries since 1910 have been conducted

by and under the supervision of the government, and a certain number of seals is killed annually on the islands, selection being made in accordance with the natural habits of the animals. The highly polygamous habit of the fur-seals naturally results in a large surplus of males, which surplus, when the rookeries were in their best condition, amounted annually to about one hundred thousand immature males on the Pribilof Islands. It is from these males that the killings are made. These half-grown males herd by themselves, on the so-called "hauling grounds" adjacent to each breeding rookery. The seals are quietly surrounded and without difficulty are driven inland, entirely away from the rookeries of the breeding seals, as easily as a flock of sheep. They are killed and skinned by the natives, who are employed by the government for that purpose, counted by government agents, and then placed in salt houses for a month's curing, after which they are shipped to market. The selecting and killing are accomplished without noise or disturbance, and everything is done decently and in an orderly way and as humanely as possible. The breeding stock upon the islands therefore remained undisturbed, and would, but for the international nuisance of pelagic sealing, have yielded forever a world supply of sealskins.

Before the killing takes place yearling males are branded for breeding purposes. The branding or marking consists in shearing or clipping with sheep shears the hair and fur from an area of suitable size on the top of the head, which mark is made sufficiently plain to be distinguished throughout the season. After the clipping is made with the shears, a light hot iron brand is placed on the clipped area. Care is taken to select for breeding purposes the best examples of three-

year-old males that appear on the hauling grounds and special care is taken that none of the seals marked for breeding are killed.

The hair seal, a very useful animal, is fairly common and quite generally distributed along the coasts of Alaska. To the natives it is very important, as from the flesh and oil is secured a considerable part of their winter food, while the skins are highly prized for covering the kayaks and umiaks and for boot soles, trousers, mittens, clothing bags, and caps and when cut in strips make a very strong and durable cord. The coast tribes barter the flesh, oil, and skins to the interior tribes for reindeer hides and furs.

Pelagic sealing, as practiced in the open sea both in and out of season, has been an international menace to the sealing industry. This is also because of the fact that such sealing permits of no selection being made, the catch consisting of young, old, male, and female seals. By far the greater portion, however, consists of female seals, for these after the young are born, go to sea to feed, returning at more or less regular intervals to nurse their young. The killing of the females at this season is followed by the starvation of their nursing young on the breeding grounds, the loss of young corresponding to the number of mother seals taken by the sealing vessels. Not only is this so but many seals killed are never retrieved.

When the Pribilof Islands were discovered by the Russians, in 1786, they were uninhabited, but a number of small colonies of natives from the Aleutians were at once established. In 1799, the islands passed into the control of the Russian-American Company, which remained in charge until the purchase of Alaska by the United States in 1867. The records of their early

operations are imperfect, but so far as available they indicate that some 1,821,639 seals were taken between 1786 and 1834. The catch consisted largely of young ones of the year, and both males and females were taken, and, by 1835, the herd had become so reduced that restrictive measures were recognized as necessary. From 1835 to 1867, when the killing was more restricted and females were spared, the herd gradually increased. During this period at least 608,000 seals were taken. At the time of the purchase of Alaska in 1867, the herd contained according to various estimates, from two to five million animals.

In 1868 and 1869 about 242,000 and 87,000 seals, respectively, were taken on the Pribilof Islands by various independent parties. On July 1, 1870, a law was enacted providing for the leasing of the sealing privilege for a term of twenty years, at an annual rental of not less than \$50,000 and a tax of \$2.00 on each skin taken. Under the terms of this act, a lease was entered into with the Alaska Commercial Company, a corporation including some of the American sealers who had operated on the island in 1868 and 1869. This company agreed to pay an annual rental of \$55,000, and a tax of \$2.62½ on each skin taken. Under this lease the company took a quota of about 100,000 seals annually until 1889. The total number of skins taken on the islands during this twenty year period was 1,977,377, and the revenue to the government was \$6,020,152. Upon the expiration of the first lease the Secretary of the Treasury advertised for bids for the lease of the sealing privilege for a further period of twenty years. Although the Alaska Commercial Company made an effort to secure a renewal of its lease, a more favorable bid was received from another corporation, the North

American Commercial Company, to whom the contract was awarded on March 12, 1890. The new lease provided for a rental of \$60,000 per annum, and a tax of \$9.62½ on each skin taken. More liberal provisions were made for the care of the natives, and the number of seals to be killed annually was placed at the discretion of the Secretary of the Treasury. During the twenty years of its incumbency the North American Commercial Company took on the Pribilof Islands a total of 342,651 skins. The revenue to the government was \$3,453,844. The leasing system was discontinued in 1910.

Until 1889 the Alaska Commercial Company had little difficulty in getting its annual quota of 100,000 skins. For some years previously an additional catch was obtained by independent operators who killed seals at sea during their migrations and feeding excursions to and from the islands. These pelagic sealers originally consisted chiefly of Canadians and Americans, but in later years many Japanese engaged in the business. Beginning to operate extensively about 1879, they rapidly increased in number, and the recorded pelagic catch from 1879 to 1911, inclusive, was 904,506. The largest recorded catch, 59,568 skins, occurred in 1891.

Recognizing that the brutal and wasteful killing at sea was greatly against the interests of the herd, the United States sought to establish jurisdiction in Bering Sea as a closed sea and seized a number of Canadian sealing vessels found operating there. This led to a controversy with Great Britain, which resulted in a treaty concluded February 29, 1892, consigning the whole matter to the deliberation of a tribunal of arbitration which met at Paris in the summer of 1893.

Among the results of the work of the Paris tribunal was a set of regulations closing to pelagic sealing a zone of sixty miles about the Pribilof Islands, and prohibiting it entirely between May 1 and July 1. These regulations went into effect in the summer of 1894, and, of course, affected only the citizens of the United States and Great Britain. They were subject to reëxamination at intervals of five years. The experience of a single season showed that the result was ineffective, since the catch from pelagic sealing increased, and the seal herd continued to decline. The United States, therefore, requested Great Britain to consider the revision of the regulations. This request was declined, and, in 1896, the country accepted the proposal of Great Britain that the two countries institute independent scientific investigations of the entire matter at the close of the five-year trial period. These investigations were made in 1896 and 1897, and a voluminous report on the work of the American investigators was published in 1898. In the meantime, on December 29, 1897, Congress had enacted a law forbidding American citizens from engaging in pelagic sealing at any time or place.

Toward the close of the term of incumbency of the North American Commercial Company, it was decided to abandon the system of leasing. The act authorizing this provided that all sealing should be done under the authority of the Secretary of Commerce and Labor through agents and officers whose employment it authorized; the natives were to be employed and their wants provided for; the sealskins were to be sold to the best advantage of the government; the purchase of the plant of the former lessees was authorized; and authority was given the department to furnish and maintain on the islands stores of necessary supplies.

The lease having expired on May 1, 1910, supplies were purchased and shipped to the islands, the plant of the retiring company was purchased for \$60,541.48, and sealskins to the number of 12,920 were taken during the first season. These skins yielded a net revenue to the government of \$403,964.94. During the year 1911, the operations on the island were conducted in much the same way as in 1910. The sealskins taken were 12,002 in number, the net receipts therefrom were \$385, 862.28.

On December 15, 1911, a treaty became effective between the United States, Great Britain, Russia, and Japan, abolishing sealing on the high seas for a period of fifteen years. By its provisions the United States and Russia, as owners or guardians of the seal herds, agreed to pay to Great Britain and Japan, for the relinquishment of their interest in pelagic sealing, a percentage, fifteen percent to each, of the product of the land sealing to be conducted by each of the two nations. In like manner Japan agreed to pay to the United States, Great Britain, and Russia, respectively, ten percent of the land catch from the small but growing herd under her jurisdiction.

On August 24, 1912, the Congress of the United States passed a law prohibiting all killing of fur-seals on the Pribilof Islands for a period of five years except the number needed as food for the natives, and providing for a breeding reserve of not less than five thousand three-year-old males annually during the life of the treaty suspending pelagic sealing. Under the operation of this law, only the skins of seals taken for food have been handled. These, including nine skins carried over from the previous season, numbered three thousand seven hundred and seventy-three in 1912. The net proceeds were \$130,640.57.

In 1913, two thousand two hundred and ninety-six sealskins were taken. With the exception of four hundred, which were withdrawn from immediate sale, these were sold and the net proceeds were about \$50,000. The sealskins taken in 1914 were reported as two thousand eight hundred and ninety-six in number.

During the three years of government management, the net revenue from the sale of sealskins amounted to a total of approximately \$970,468. As elsewhere stated, \$6,020,152 was derived during the period of the first lease of the sealing privilege and \$3,453,844 during the second lease. Since the acquisition of Alaska by the United States in 1867, therefore, the direct revenue to the government from the fur-seal has amounted to approximately \$10,444,464. Considerable additional revenue has accrued to the government from the importation of dressed skins from foreign countries. The data for that part of this chapter relating to fur-seals and pelagic seal fishing has mainly been gleaned and condensed from government documents and, therefore, may be relied upon as being accurate.

Dogs

My dear dumb friend, low lying there,
A willing vassal at my feet;
Glad partner of my home and fare,
My shadow in the street;
I look into your great brown eyes,
Where love and loyal homage shine,
And wonder where the difference lies
Between your soul and mine.

J. G. HOLLAND.

Dogs are found in all parts of the world, and all, even the wildest of them, are capable of some degree of domestication; as the companion of man, they are found under all circumstances of human existence. In a group thus eminently capable of domestication, it is not surprising that in the earliest times one or more species should have been brought under the dominion of man, or that under human care the domestic dog should have become, as Baron Cuvier calls it, "the completest, the most singular, and the most useful conquest ever made by man." There is sufficient evidence to show that dogs existed in a domesticated state during prehistoric times; consequently neither history or tradition is available to solve the question of their origin.

But of one thing we are sure, and that is that the many species of dogs belong to the genus *canis*, and to the family *canidæ*, which also includes the wolf, fox, and jackal. Darwin says: "It is highly probable that the domestic dogs of the world have descended from

two good species of wolves, *canis lupus* and *canis latrans*, and from two or three doubtful species of wolves, namely, the European, Indian, and north African forms, from at least one or two South American canine species, from several races or species of the jackal, and perhaps one or more extinct species." The most that can be asserted with confidence in regard to this matter, is that no one animal can claim the exclusive paternity of these useful races. The consensus of opinion, however, is that the large semi-domesticated dogs of the northern parts of both hemispheres may be regarded as principally derived from the various species and varieties of wolves existing there. The Indians are said to take the young of wolves in order to improve their canine breed, and this proves that the dog and wolf are sufficiently fertile inter se.

In Captain Cook's *Voyage Around the World* it is said: "The natives had a great many dogs of the fox kind rather large and of different colors, with long, soft hair-like wool. They are probably used in drawing their sledges in the winter, for sledges they have, as I saw a good many laid up in one of the winter huts. It is also not improbable that dogs may constitute a part of their food. Several lay dead that had been killed that morning. . . . At Sledge Island we found a little way from the shore where we landed a sledge which occasioned this name being given to the island. It seemed to be such a one as the Russians in Kamtschatka make use of to convey goods from place to place over the ice or snow. It was ten feet long, twenty inches broad, and had a kind of rail work on each side and was shod with bone. The construction of it was admirable and all the parts neatly put together; some with wooden pins but mostly with thongs or lashing of

whale bones which made me think it was entirely the workmanship of the natives."

The Nootka dog, *canis laniger*, is noted for its thick and matted fur. It evidently was this species that Vancouver found in 1792 in the vicinity of Port Orchard, concerning which he says: "The dogs belonging to this tribe of Indians were numerous, and much resemble those of Pomerania, though in general, somewhat larger. They were all shorn as close to the skin as sheep are in England; and so compact were their fleeces, that large portions of them could be lifted by a corner without causing any separation. They were composed of a mixture of a coarse kind of wool, with very fine long hair, capable of being spun into yarn." This description exactly meets that of the coat of "Prince," my thoroughbred Scotch collie, concerning which the stanza by J. W. Holland expresses my thought and query, "Where the difference lies between your soul and mine?"

Long before and ever since the time of Vancouver, dogs have been the constant companions and servants of both the Indians and whites of British America and Alaska. They were utilized by the Indians before the Hudson's Bay Company invaded the great northwest. They have been of the greatest value to the inhabitants of the boreal regions of America in hunting the seal, bear, and reindeer, and equally useful as beasts of burden and for drawing sledges over the snow. They have borne a prominent part in Arctic exploration, and much of the difficult work done in this field would have been well nigh impossible without them. They have been the most important factors in the transportation problems of Alaska. In the first three voyages which I made to Alaska and return after leaving Vancouver,

I saw only four horses and one mule in service, one of which was at Wrangell, two at Skagway, and two at Sitka. On the other hand, I saw dogs and plenty of them at every landing that was made by our boats. Underwood in his *Alaska, an Empire in the Making*, says: "During the summer the chief occupation of an Alaska dog seems to be to lie on the sidewalk and push the white man off into the mud, but he comes out strong in the winter as a sharer of hardship, an aid to transportation, and worker and a sport."

There are two species of Alaska dogs, namely, "malamutes" and "huskies." According to Underwood, the difference is that the malamute has for its progenitor the wild dogs that have roamed the silent plains of Alaska since time immemorial, and the husky is bred from the timber wolf. Except that the husky is somewhat larger than the malamute, both species are very similar in appearance. Their usual color is smoky grey, although once in a while a black malamute is encountered. Both have round-pupilled eyes, and like the Nootka dogs, have long hair, under which in winter, they grow a soft fur which is discarded in summer; both have bushy tails, strong legs, and deep chests. Neither have learned how to bark, but both can howl like a wolf and yelp in voices that are decidedly unmusical; at times they will sit on their haunches and give forth the most horribly discordant wails it is possible to imagine. This is especially so with the advent of a full moon in the sky. Their characteristics are identical in every respect. Both are faithful servants, great fighters in a rather cowardly manner, and inveterate thieves. They travel for great distances without becoming footsore. The years that their ancestors have lived in the northern country have evolved feet

which are almost impervious to the hard cutting edges of the crusted snow, and in addition to this, the hair grows right down to the tips of the toes as a protection against the rigorous climate. Their chief food consists of fish, which is fed to them once a day and after their day's work is done. After eating they lie down in the snow to sleep; at other times they dig a deep hole into the snow, crawl into it, curl up in their own fur, and sleep sweetly.

Any written description can give but a faint idea of dog-driving. It is an art in itself. The nature of dogs is cross-grained, and they frequently do the wrong thing with apparently the best of intentions. Each has a peculiar look and character. Some are irreclaimably lazy, others enjoy hard work unless pushed too far; some are greedy and snappish, others good humored and decorous. All are very practical, showing affection only for the man who feeds them, and for him only as long as he feeds them. In Alaska "mush" or "mush on" is the universal command given to dogs when they are being driven. The word "mush" had its origin with the French Canadian dog drivers employed by the Hudson's Bay Company who told their dogs to "marche-on." It has been said that no man can drive these dogs without swearing. This may not be true, but it is true that it is almost a universal habit with their drivers to affix or prefix an oath to the command "mush." The dogs dislike the whip and will always destroy one if they can get hold of it. The whip used is made with a short handle, a very long lash, braided of leather or sealskin, and usually loaded with sheet lead or bullets in the core.

Julian A. Dinock, in *Travel* for August, 1916, says: "Every breed of dog is used before the sled. For

heavy hauling the larger dogs are best, but huskie, bull, spaniel, setter, and terrier are found between the traces. Some of the lighter breeds can make faster time with light loads, and they are not so likely to break through a thin crust as the mastiff type. The huskie is primarily the dog of the Eskimo and is best adapted to the conditions of rough work. He is likewise the hardest to manage. He will travel sixty miles a day for a month at a time, and be in good condition at the end of the trip, but he is very likely to demand a thorough understanding with his driver at the beginning of the acquaintance. One team, upon the advent of a new driver, broke into open rebellion, and in a solid mass of dogs set upon the man. Fortunately, he saw them coming in time to get his back against a shack. With his rifle he clubbed the first comer, and then, with the murderous thong of his whip, he laid out right and left until the air was thick with yelps and jumping dogs. Finally it dawned upon the brutes that they had met their master, and the battle ended as suddenly as it had begun. Six panting dogs stretched themselves out upon the snow as if nothing had happened. The man waited a little, and then walking up to the first dog, which chanced to be the leader, began harnessing him. As soon as the collar was fastened around his neck the dog sprang to his place at the head of the line, and the others sullenly followed."

Glaciers

Ages are your days,
Ye grand expressors of the present tense
And types of permanence;
Firm ensigns of the fatal Being
Amid these coward shapes of joy and grief
That will not bide the seeing.
Hither we bring
Our insect miseries to the rocks,
And the whole flight with pestering wing
Vanish and end their murmuring,
Vanish besides these dedicated blocks.

— EMERSON.

In the chapter on Mount Rainier I had something to say about glaciers. John Muir, the greatest of authorities on glaciers, says: "The great depth of volcanic ash and the large layers of lava northward along the Cascade range through Oregon and Washington with the cones of the Three Sisters, Mounts Jefferson, Hood, St. Helens, Adams, Rainier, and Baker tell unmistakably the unwritten story of the era of active volcanic action which took place along the northwest coast of those states many centuries ago. That era was followed by a glacial period, the residual of which still exists upon the highest of the mountains named." He adds: "From Mount Rainier, the highest of this series of volcanic cones, eight glaciers five to ten miles long radiate, descending to within three thousand to four thousand feet of the level. On through British

Columbia and southeastern Alaska the broad, lofty mountains along the coast are usually laden with ice. The upper branches of nearly all the canyons are occupied by glaciers, which increase in size gradually and descend lower until the region which is highest and snowiest, between latitude 56° and 61° is reached, where a considerable number discharge fleets of icebergs into the sea. This is the Iceland of Alaska, the greatest of glacial abundance on the west side of the continent."

From a steamship as we travel north, we get few glimpses of glaciers until we have crossed the international boundary line into Alaska. Rudyard Bay is surrounded by mountains which are covered with them, and as we depart from the bay we face on Revilla Gigedo Island what seems to be an extensive one. It is at Wrangell, however, that the glacier panorama begins. Up the Stikeen River, on the east side, is the Stikeen Glacier. Across the Stikeen River from Wrangell along the continental coast up to Skagway are seen in succession the following large glaciers, namely, Patterson, Baird, Young, Yosemite, Toyatt, Windom, Taku, Eagle, Auk, Meade, and Dewey, with many small ones which have not been named. South of Skagway and facing to the east the Davidson Glacier is seen from the Lynn Canal, and facing Glacier Bay are located Muir, Pacific, Hugh Miller, and Geikie glaciers, and further northwest the Malaspina, Valdes, and other glaciers, many of which are located in the vicinity of Port Wells.

Glacial ice is rarely found in the open waters of Prince William Sound. It is discharged by Columbia Glacier, northward of Glacier Island, and is driven into the sound by northerly winds; it may be expected,



TAKU GLACIER, ALASKA

depending on the winds, from Bligh Island to Bald Head, Chris Island, and as far south as Storey Island. There are, as I have before said, numerous discharging glaciers in Port Wells, the northwest arm of the Sound, but the ice rarely reaches the entrance of the port. There is a discharging glacier at the head of Blackstone Bay, but the ice is confined to the bay. Ice is discharged by Chenega Glacier on the southwest side of the Sound, and occasionally drifts eastward as far as Point Helen and the north entrance of Latouche Passage through the passage south of Chenega Island.

In this connection it will be well in the general way to answer the questions, What is a glacier and why are there so many of them in southeastern Alaska? Vancouver never uses the word – simply speaks of snow and ice-covered mountains. Broadly speaking, a glacier is an accumulation of ice of sufficient size and weight to force its way down some titanic mountain crevice from a snow-covered elevation. It is a river flowing from a lake, the latter up near the summit of a great peak or range of mountains, the former pouring down the valley below, only it is a lake of snow and a river of ice. It thus becomes apparent that the primary functions of a glacier and river are identical, namely, the drainage of a certain district or basin, only in the one case the stream is solid and in the other fluid. It has been found that this resemblance applies in many other particulars; indeed, almost every characteristic of a river has a parallel in that of a glacier.

The supply for the renewal and continuance of glaciers is from moisture which is precipitated on the top of high mountains during practically the entire year. This falls in the form of fine sand-like granular snow. Such snow is dry, and if it always continued so, the

formation of a glacier from it would be impossible. In such case a fresh layer would be laid on every year, and if this process continued without interruption, every mountain which rises above the snow-line would augment annually in height. This, however, is averted, for under the influence of the clear atmosphere a part of the snow evaporates directly into the air to be precipitated again. But by far the larger portion of it is converted into glacial ice. The first action of the summer seen is to raise the temperature of the superficial snow to 32° , and afterwards to melt it. The snow is thus converted into the ice of the glacier by a process of saturation and freezing which by the process of pressure becomes glacified ice. At its origin then a glacier is snow – at its lower extremity it is ice, which by the process of melting becomes water.

The moraine of a glacier consists of a line of blocks of rock and gravel extending along the sides of separate glaciers, and along the middle part of glaciers formed by the union of two or more separate ones. "The surface of a glacier does not long retain the shining whiteness of the snow from which it is derived. It is flanked by mountains which are washed by rain, dislocated by frost, riven by lightning, traversed by avalanches and swept by storms. The lighter debris is scattered by the winds far and wide over the glacier sullyng the purity of its surface. Loose shingle at intervals rattles down the sides of the mountains, and falls upon the ice where it touches the rocks. Large rocks are continually let loose, which come jumping from ledge to ledge, the cohesion of some being proof against the shocks which they experience; whilst others when they hit the rocks, burst like bomb-shells, and shower their fragments upon the ice. Thus the glacier

is incessantly loaded along its borders with the ruins of the mountains which limit it. Long ridges of debris thus flank the glacier, and those ridges are called lateral moraines." Moraines are designated by their position as respects the glacier. The power to transport rocks and other material over great distances is one of the most interesting characteristics of glaciers. The rocks which fall on the *nevé* from the cliffs above are soon buried in the bed of snow. This turns to ice, as we have seen, and begins its slow but constant journey to the valleys bearing its burden of rocks, which ultimately will be cast upon its terminal moraine. A fine illustration of this is seen at the mouth of Nisqually Glacier on Mount Rainier.

On such a glacier a number of surface characteristics may be noted. The smaller stones sink slightly into the ice because these absorb heat from the sun which melts the ice underneath them. The larger pieces of rock are so thick that they do not become heated through during the day and thus the ice is protected. The effect of this is to raise them on pedestals of ice; these are called glacier tables. These gradually become higher until undermined by the heat entering from the sides, melts the ice and the rocks fall, only to begin the operation afresh. Often piles of small stones collect together and form small cones and protect the ice in a similar way. Sometimes these assume peculiar shapes, and often it is hard to believe that they have not been piled by human hands. A glacier as it slowly winds its downward way grinds and pulverizes the materials that forms its sides and the floor of its rocky channel. Much of the material is ground into glacial sands; some of it, however, consists of polished stones of many sizes, most of them being oval in shape. I have in my

possession many of these that I have collected from the different glaciers that I have visited.

The movement of a glacier is continuous and as a whole; its movement, however, is not uniform but variable. Its movement is governed by the size of the glacier; the larger ones move more rapidly. It also moves faster in the summer than in the winter. It does not move like a solid body sliding down a channel; the velocity of each part of its breadth is different. It moves faster in the center than at the sides and more slowly at the bottom than at the top. The cause of its slower movements at the sides and bottom is due to friction caused by coming in contact with the rough surface of the sides and bottom through and over which it moves. At a narrow point the flow is more rapid than at a broad one, and in especially uneven places the ice may be broken up into pinnacles, just as water foams through a rapid. The movement of the ice is of course infinitely slower than that of water.

Tyndall says that the fact of glacier-motion has been known for an indefinite time to the inhabitants of the mountains; but that the first who made quantitative observations of the motion was Hugi. He found that from 1827 to 1830 his cabin upon the glacier Aar had moved 100 meters, or about 110 yards, downwards; in 1836 it had moved 714 meters; and in 1841 M. Agassiz found it at a distance of 1,428 meters from its old position. This is equivalent, in round numbers, to an average of 100 meters a year. In 1840, M. Agassiz fixed the position of the rock known as the Hotel des Neufchatelets; and, on September 5, 1841, he found that it had moved 213 feet downward. Between this date and September, 1842, the rock moved 273 feet.

Taku, Muir, Hugh Miller, Grand Pacific, and other

glaciers come down to and discharge great icebergs into the sea. Next to a fire at sea there is no calamity more dreaded by mariners and travelers than a collision with an iceberg, for it combines every element of mystery and danger. Icebergs are nature's derelicts at sea. They drift without sail or rudder far out into the paths of ocean travel and become a menace to every passing ship. Many of the bergs are overturned or tilted as they break off from glaciers into the water and set sail. No matter what the size of the berg may be only one-ninth of the mass of ice is seen above the water. Even that is often huge enough to overtop the largest ship, and the submerged part of the mass gives it weight enough to crush any ship that strikes it. The floating monsters are sometimes years in melting, and in gradually disintegrating they assume an endless variety of shapes from regular geometric figures to masses of glittering ice crowned with domes, minarets and peaks, beautiful to the eye but deadly to encounter. Ships always try to give them a wide berth, but the mass under water is so much greater than that above that they are sometimes run into quite a distance from the part that is visible.

The explanation of the massing of glaciers along the southeastern coast of Alaska is easily made. The supply for the renewal and continuance of glaciers is from moisture precipitated on the tops of the mountains during practically the entire year. The general circulation of the Pacific Ocean brings to the Gulf of Alaska what is known as the Japan current water which has been warmed in the tropics and still retains so much heat that its mean temperature is considerably above the normal for that latitude. The ocean is therefore, at most seasons warmer than the contiguous land, and

though air currents passing from ocean to land convey heat to the land they are themselves cooled. While traversing the ocean the air becomes loaded with moisture, the cooling over the land diminishes its water-carrying capacity, and part of its load falls to the ground either as rain or snow. Because of the fact that this coast is mountainous, the air flowing landward is compelled to rise, and its capacity is still further reduced by rarefaction. At the greater altitude the ratio of snow to rain is comparatively large, and the mountains thus become gathering grounds for the snows that feed the glaciers.

Prince William Sound

On May 25, Vancouver's vessels anchored in Port Chalmers on the northwest side of Montague Island in Prince William Sound. Two boat parties were sent out under Mr. Whidbey and Mr. Johnstone to resume the survey work that had been discontinued the previous year. On June 8, while working their way up a branch named Port Wells, Whidbey's party met such huge bodies of ice, some afloat, others lying on the ground near the shore in ten or twelve fathoms of water, as rendered their further progress up the branch rash and highly dangerous. This, however, was an object of no moment, since before their return they obtained a distinct view of its termination about two leagues further in the same direction, by a firm and compact body of ice reaching from side to side, and greatly above the level of the sea; behind which extended the continuation of a range of lofty mountains whose summits seemed to be higher than any that had yet been seen on the coast. Whilst at dinner in this situation they frequently heard a very loud, rumbling noise, not unlike loud but distant thunder. Similar sounds had often been heard when they were in the neighborhood of large bodies of ice, but they had not been able to trace the cause. They now found the noise to originate from immense fragments of ice breaking off from the higher parts of the main body, and falling from a considerable height, which in one instance produced so violent a shock that it was sensibly

felt by the whole party, although where they were, was at least two leagues from where the fall of ice had taken place.

In the course of their explorations Johnstone's party landed on Hinchinbrook Island and found a cross bearing an inscription in Spanish dated 1790. At Port Etches they visited a Russian establishment, and were received by the principal person, Mr. Peter Colomance, with every mark of polite cordiality. He conducted the party to the Russian residence, which in most respects resembled the one visited in Cook Inlet, though on a smaller scale. This, however, was better defended, as a galliot of about seventy tons was hauled on shore, placed erect, and formed nearly one side of a square, within which their houses were built. On board of this some Russians, well-armed, constantly resided, and on her decks some swivel and carriage guns were mounted; three of the latter were also at the entrance of the large common dwelling-house. Here the visitors were seated to breakfast, consisting of boiled seal's flesh, train oil, and a few boiled eggs, served up with a degree of neatness correspondent to the delicacy of the articles of which the repast was composed. The skin and most of the hair was still adhering to the flesh of the seal, and the other viands not being very inviting to persons accustomed to a different diet, Mr. Johnstone begged leave to add their portion of chocolate, beef, and bread to the breakfast, which was readily admitted, and to this food their Russian host did ample justice.

The Russians at this establishment were said to amount to one hundred, who, with those in the upper part of Cook's Inlet under Mr. Zikoff, were in the interest of one particular company of merchants, distinct

from those under the direction of Mr. Baranoff, who now resided chiefly at Kodiak, while his party extended their traffic principally along the exterior coast of the peninsula, towards Montague Island. Mr. Johnstone also learned that the Russians had not formed any establishment to the eastward of the Port Etches station but that their boats made excursions along the exterior coast to Cape Suckling and their galliots much farther.

Some consideration will be given to Prince William Sound as it is now known. Vessels from the northwestward enter Prince William Sound through Erlington Passage and leave it through Hinchinbrook Entrance. In order, however, that this book may give a continuous story of the coast this account will begin with Aialik Bay rather than with Erlington Entrance.

Aialik Bay is eighteen miles long from the north end of Harbor Island. It is inclosed by rugged mountains and glaciers and is of no importance except occasionally as an anchorage. The shores are steep and high with precipitous slopes in many places, and are partly wooded in the southern part of the bay to an elevation of about one thousand feet. The northern part of the bay is covered with alders in places. It has deep water with the exception of rocks near the shores and a bar which crosses the bay from the glacial flat fronting Pederson Glacier. To take advantage of smoother water, small vessels in coasting southwestward from Resurrection Bay, and the reverse, sometimes enter the bay at Aialik Cape, pass south of Chat Island, round the north end of Harbor Island, and pass out at Granite Cape.

Cape Resurrection is a precipitous headland of solid rock, with little vegetation except some trees on the lowest slopes. From the eastward two domed-shaped

peaks, the northern one the higher, with a slight notch between them show at the end of the cape; with a somewhat lower range back of them but rising to higher mountains farther north. Resurrection Bay is about eighteen miles long from Cape Resurrection. Its depths are great throughout, and there are no dangers in the usual track of vessels. Its shores and islands are steep and high, with precipitous slopes in many places. The valleys are wooded up to an elevation of one thousand feet. The anchorages are few and indifferent on account of the great depths, and are subject to heavy williwaws. Bear Glacier, large and prominent, is on the western shore of Resurrection Bay, westward of Cape Resurrection. It is not discharging any icebergs.

I first visited Resurrection Bay, September 27, 1914. Our vessel passed Cape Resurrection at four P. M. Not then knowing the name of the cape, I entered it in my note book as a "Cathedral with its towers and turrets with the appearance of being ivy-covered to the right." Such was the impression it made on my mind. Caines Head was ahead of us to the left. The sunlight upon the snow-capped mountains and glaciers was most beautiful. The passage by Sunny Cove and the narrows at Caines Head was like that of passing into fairy land. Spread out before us was one of the most beautiful bodies of water that I had ever seen. At the head and on the western side is Seward, an important town with a population, at that time, of about six hundred. The town, on a level plateau with its background of snow-capped mountains, presented a most attractive aspect. It seemed to be a very busy mart with its stores and hotels. The main street through it has a width of one hundred feet. Our vessel, the Admiral Sampson,

was on her first voyage. A large concourse of citizens and dogs were on the wharf—the former to see and greet the new vessel, and the latter to get the bones thrown to them from the kitchen.

Seward has cable connection with other points in Alaska and Seattle. From it a railroad has been constructed across the Kenai Peninsula to the head of Turnagain Arm, and its construction is being prosecuted toward the Matanuska coal fields and Fairbanks. There is communication by telephone and telegraph to points in the interior along the line of the road.

The coast southward from Resurrection Bay to Cape Puget is high and rugged, with numerous glaciers showing in the valleys. Cape Puget is a high, sloping headland, with several bare rocks off it, the furthest about three-eighths of a mile. From alongshore the cape shows a wooded peak at the end, with a large conical rock in the water close to its foot.

Prince of Wales Passage, between Hoodoo and Bainbridge islands, is between ten and eleven miles long and from one-half to two miles wide. It offers a direct route for vessels from northward in Knight Island Passage southwestward along the coast; otherwise Erlington Passage is more direct and is generally used. Our vessel steamed through this passage. Prince of Wales Passage has a number of dangers, but no trouble is had in going through it in daylight and clear weather with the aid of the chart.

Latouche and Erlington passages, between the Latouche and Hoodoo islands, are generally used by vessels between Prince William Sound and the coast southward. There is also considerable traffic to the wharves of the copper mines on the west side of Latouche Island. Our vessel made calls at three mines, both as

we were going to and returning from Cook Inlet. The mines are located high up on the mountain side, and the ore is lowered to cars on a tramroad over which it is carried about a half mile to the wharf and loaded directly upon boats for transportation to the smelters.

Port Wells is the midway point between the north and south parts of Prince William Sound, and may be regarded as the gateway to the most wonderful glacial display on the north Pacific coast. Passage Canal has its entrance at the southwest end of Port Wells between Point Pigot and the peninsula separating Cochrane and Blackstone bays. The canal trends west-northwestward for four miles and then southwestward for eight miles. The canal is one to one and a half miles wide, has great depth of water, and is clear except in a very few places near the shores. The shores rise abruptly to an elevation of two thousand to four thousand feet, and are wooded to an elevation of about one thousand feet. The higher peaks are bare or snow-covered. The principal approaches to the canal and the canal itself offer little difficulty for navigation.

Glacier Island is a good starting point for the consideration of the south part of Prince William Sound to Cape Hinchinbrook. This island is on the north side of the sound, westward of the entrance of the Valdez Arm. It is mountainous and indented by a number of bays, of which Chamberlain Bay and Jackson Cove are the only ones that have been sounded.

Valdez Arm, the northern arm of Prince William Sound, extends about thirteen miles in a northeast direction from Busby Island and Point Freemantle to the northern end of Valdez Narrows, and then turns to the northeast by east for eleven miles to the town of Valdez at its head. The water in this arm is very deep



VALDEZ, ALASKA, IN 1914

and there are no outlying dangers in it except that of Middle Rock. There are few anchorages in it on account of its great depths of water. Valdez Narrows is about two miles long and three-fourths of a mile wide, with deep water and bold shores, especially the eastern ones. A wooded islet lies three hundred yards from the western shore at the north end of the narrows. Shoup Bay at the mouth of Shoup Glacier is closed by a sand spit nearly all dry at low water and over which the least depth is about seven feet. This is often filled with floating ice, some of which escapes into the port when the wind and tide are favorable. A wharf off the Cliff Mine extends into Port Valdez from the easterly point at the entrance to Shoup Bay. Swampport is a small anchorage under Point Jackson, the western end of the northern one of two islands on the south side of Port Valdez, three and three-quarter miles from Valdez. Fort Liscum is an army post and wharf on the south shore about one mile eastward of Point Jackson.

Valdez is an important town at the head of Port Valdez. It has a post office, stores, hotel, printing office, an assay office, and an ore-testing plant. When I was there in 1914, I called upon an editor in quest of information about the place. He said: "Valdez has a population of about fifteen hundred; it is the best town in Alaska, has the best streets, best improvements, and everything else needed in growing towns: Valdez has got them all skinned." Most of the vessels trading in Prince William Sound call at Valdez, and there is communication by small local craft with other places on the sound. From Valdez, a government trail and telegraph line lead into the interior of Alaska, and there is an overland mail service. There is cable com-

munication with other points in Alaska and with Seattle. Two wharves extend out from the town to the edge of the flat.

Fidalgo Bay has its entrance on the eastern shore of Prince William Sound between Goose and Bligh islands, where it is five miles wide, and extends northward more than twenty-two miles. The waters of this bay are deep and free from outlying dangers. There are copper mines in Boulder and Landlocked bays and on the north shore of Fidalgo Bay, between Irish Cove and Whalen Bay.

Orca Bay is an extensive arm of Prince William Sound between Point Johnstone and Knowles Head, having a length of about thirty miles in a northeast by east direction. Its principal importance is derived from the railroad terminal of Cordova on Orca Inlet at its head. Its southern side is formed by Hinchinbrook and Hawkins islands, and it is clear with the exception of Middle Ground Shoal. Its north side is indented by large bays, which are of no present commercial importance. This bay was named after Orca, the killer whale, an account of which will be found in the chapter on whales and whale fisheries. Orca Inlet extends in a southerly direction from the head of Orca Bay.

Cordova, the tidewater terminus of the Copper River and Northwestern Railroad, is on the east shore of Orca Inlet, eastward of Spaka Island. It is a modern, substantially built, and up-to-date city in every respect. It is twelve hundred and thirty-six miles northwest of Seattle and a little over four hundred miles from Fairbanks. The log-book of our voyage in 1914 showed that we had traveled sixteen hundred and fifty-eight miles in getting to Cordova from Seattle. Cordova

was surveyed and platted as a town in the summer of 1908 and was laid out with a view of accommodating a large city, with seventy-foot streets and with fourteen-foot alleys between. The business blocks would be a credit to any city, most of them having plate glass fronts, while the residences were built with a view to architectural beauty, comfort, and permanency. Electric light, telephone, water, and sewage systems have been installed. The water system is a gravity one with a pressure of eighty pounds to the square inch, and the water is absolutely pure, having its source in perpetual snow. The city boasts of a ten thousand dollar school building, with experienced teachers and a well-graded system. Besides the local telephone system, there is a long distance service from Cordova to Katalla, and also along the railroad to all stations as far as Kenne-cott, a distance of about one hundred miles. Two well-equipped newspaper plants publish a daily and Sunday newspaper, containing the local mining news, as well as the happenings of the world reached by cable. The government maintains a cable office, the largest wireless station on the coast, a federal jail, and a commodious post office. A deputy collector of customs and a deputy supervisor of forestry are located here, and Congress has made an appropriation of one hundred thousand dollars for the erection of a large public building to house all of these offices.

The Copper River and Northwestern Railroad, which starts from the wharf at Cordova and penetrates the interior for a distance of one hundred and ninety-six miles, was built at an approximate cost of twenty million dollars, and taps one of the richest mineral belts in the world. At its terminus is situated the famous Bonanza Copper Mine, with a down grade

haul of the ore from there. This is a broad gauge road, modern and first-class in every respect. The road bed is as good as that of any trunk line in the states; rock ballasted, seventy-pound steel rails, and everything of the highest standard.

A great engineering feat was accomplished in the construction of this road, around which centers an industrial romance without precedent. Four magnificent steel bridges, spanning rivers and gorges, were built at a cost of over two million five hundred thousand dollars. The bridge at Miles Glacier alone cost one million five hundred thousand dollars. By private capital demonstrating the feasibility of constructing and operating the year round a railroad between a tide-water terminus on Prince William Sound in a sheltered harbor to interior Alaska, it proved the opening wedge for the government to awaken to the great mining and agricultural possibilities of this northland and has resulted in Congress appropriating thirty-five million dollars to build a trunk line through to the Tanana valley, with a branch to the Bering River coal field.

Cordova is an open port every day in the year, with a deep, well-sheltered harbor that can be easily fortified against invasion or attack. The harbor of Christiania is closed from thirty to sixty days a year, necessitating the use of an ice-breaking boat; whereas Cordova and other Prince William Sound ports are never icebound. These splendid harbors, sheltered by surrounding mountains, are sufficiently commodious to hold the Pacific naval fleet at maneuvers, while the ocean liners can lie at anchor or tie up at the dock with perfect safety, no matter how stormy it may be outside. On account of their strategic advantages these harbors are the best natural naval base in the Pacific, and the fed-

eral government has reserved a naval station on Hawkins Island, directly in front of Cordova, which bounds one side of the land-locked harbor, and where the battleships of Uncle Sam's entire western fleet will coal when the necessary improvements are made and Alaska's coal is mined.

On the morning of June 5, while Vancouver's ships were lying in Port Chalmers and some of the crew were engaged in making a new bowsprit for the *Discovery*, some strangers landed from canoes at the brewing tent. As they did not show any disposition to come on board, Vancouver paid his compliments to them on shore and found that their party consisted of eight Indians and a Russian. Vancouver invited the Russian on board and requested that he send the Indians to procure some fish, for which they would be well rewarded. The Russian positively declined the invitation but said that he would himself go and fish for them; on this the canoes were launched and the whole party set off. In the evening two of the canoes, with four of the Indians returned, but the Russian was not one of the party, nor did they bring with them any fish or other articles for sale. Vancouver made them some presents that seemed to give them much pleasure, and he then endeavored to make them understand, that he had an abundance of such things that he would gladly exchange with them for fish and wild fowl. As it had plainly appeared by the behavior of the Russian that he was under considerable apprehension for his personal safety if he visited the ship; Vancouver sent him some bread, pork, and rum, with the hope that such friendly influences would dissipate his fears and give him such confidence as to encourage him to pay them another visit. On Friday morning, June 6, the four Indians again re-

turned and brought with them two wild geese and two divers as a present from the Russian, who, as Vancouver understood the Indians, was still afraid to venture on board. Vancouver intrusted the Indians with articles that he knew would be acceptable to the Russian, together with the strongest assurances of friendship and of their desire of seeing him. With this the Russian complied the next day, Saturday, June 7, and Vancouver was informed by him that the Indians had faithfully discharged their commission. Two other Russians had joined his party, and the three paid Vancouver an early visit. He, who had been so unwilling to visit the ship, Vancouver now found was named Ammus Nicounervitch Ballusian. He appeared to have more acquaintance with geography and sea charts than the rest of his companions; he seemed also in other respects to be an intelligent man, and soon comprehended the object of Vancouver's visit, and that he much wished to see a Russian chart of their modern discoveries in this part of the Pacific Ocean. This wish Ballusian said could be easily gratified, as he had such a chart at Port Etches which had been recently made and sent from Kamtchatka; this he very civilly offered to fetch, and after taking some refreshment, he departed for this purpose, leaving his companions behind.

On the afternoon of the 8th, a party of about twenty Russians visited the ships from Port Etches, in one of their large skin canoes, conducted by the same person who had been the leader of the party that had visited Vancouver amongst the ice in the upper part of Cook Inlet. From him Vancouver learned that on his quitting the ship they had proceeded up Turnagain Arm, and from thence they had crossed the isthmus by land and gone to Port Etches, where he had remained ever

since. He also gave Vancouver to understand, that Mr. Colomance would be with them in the morning, which took place agreeably to his information; and with him came Mr. Ballusian, who brought the chart he had gone in quest of and very politely allowed Vancouver to copy it.

The inclemency of the weather having prevented Mr. Johnstone from examining the exterior coast, and having greatly delayed Vancouver's business, especially in the carpenter's department, Mr. Puget received Vancouver's orders to proceed with the Chatham from Port Chalmers, and to continue the survey of the continental shore to Port Mulgrave, where he was to remain until July 15. In the event, however, of Vancouver not having arrived there before that time, Mr. Puget was then to proceed to Cross Sound. On this service the Chatham departed, Wednesday, June 11, as did Vancouver's Russian friends.

Icy Strait, Cross Sound, and Glacier Bay

On June 12, the Chatham under Puget got clear of Prince William Sound and sailed round Cape Hinchinbrook and along the eastern shore of Hinchinbrook Island. On the 15th, the vessel reached Cape Suckling and from there made for Cape Hammond. While she was anchored off Kaye's Island, repeated trials were made to take some fish with hooks and line but to no effect; some refreshments were, however, procured, as the western side of Wigham Island afforded a supply of upwards of sixty dozen of eggs, which proved excellent, although taken from the nest of sea-fowls, consisting chiefly of sea parrots, shags, and curlews; no ducks were seen, and only two geese were observed. The eggs were taken from steep, rugged, rocky cliffs, constituting in many places the shores of this island, which was moderately wooded and had on its eastern side two small streams of fresh water.

In the morning of June 27, near Digges Sound a number of canoes made their appearance to the southward, which occasioned some little concern, as the inhabitants of the bay were reputed to be a treacherous, unfriendly, and barbarous tribe. This concern, however, was soon done away by a visit from Mr. Puget's old Russian acquaintance Portoff, who informed him, that the canoes belonged to him and were then fishing for his English friends. This was soon confirmed by their bringing on board a plentiful supply of halibut, which proved to be extremely good and was very ac-

ceptable. These canoes were manned with a numerous party of the Kodiak and Cook Inlet Indians, but not a single inhabitant of the bay was in the party. Portoff had quitted Cook Inlet about a month or five weeks before, with seven hundred skin canoes, carrying about fourteen hundred Kodiak and Cook Inlet Indians, with nine Russians, all under Portoff's direction, on an expedition to procure sea otter and other furs. The whole party were now assembled in this bay.

Mr. Puget, in the morning of June 27, sent a boat to examine Digges Sound. Shortly after noon, the boat returned and Mr. Puget was informed that it was closed from side to side by a firm and compact body of ice, beyond which at the back of the ice a small inlet appeared to extend. The depth of the water at the entrance of the opening was great, and on its northeast side was a bay which afforded good anchorage but had a most dreary aspect from its close vicinity to the ice; notwithstanding this, the vegetation was in an advanced state of forwardness. Digges Sound was the only place that presented the least appearance of any interior navigation, and this was necessarily very limited by the close connected range of snowy mountains that stretched along the coast at no great distance from the seaside.

At this time about fifty canoes of Portoff's party were about the boat, and the Indians carried on an advantageous commerce, purchasing white shirts, stockings, cravats, and other parts of the officer's apparel, giving in return bows, arrows, darts, spears, fish-gigs, whale-gut shirts, and specimens of their very neat and curious needle-work. In the evening, Portoff, after distributing a few pinches of snuff to some and filling the boxes of others, formed the Indians into three divisions and dis-

patched all in quest of sea otters, and they departed with the greatest cheerfulness.

From Digges Sound the Chatham proceeded to Port Mulgrave, passing through on the way some exceedingly constricted narrows. On July 5, she quitted this place and the same evening reached the open ocean and directed her course for Cross Sound. On approaching Cape Spencer a dozen natives in one canoe visited the ship, but not one of them would venture on board, without a hostage being sent into the canoe. On this demand being understood, Mr. Puget ordered one of his people into the canoe, upon which being done the chief immediately repaired on board with a large supply of halibut, which was purchased with some iron. Whilst this traffic was going on, and the hostage remained in the canoe, the chief seemed perfectly satisfied, and reconciled to his situation; but the instant the man was to come from out of the canoe on board, the chief returned. Mr. Puget and the gentlemen on board the Chatham had been equally deceived with Vancouver's men by the appearance of the ice, and had tacked to avoid approaching too near to some places which they had supposed to be rocks; when they discovered the mistake they soon joined Vancouver in Port Althorp.

Some further space will now be devoted to a further consideration of the coast from Cape Hinchinbrook to Port Althorp, surveyed during this cruise of the Chatham.

Katalla Bay, twenty-three miles northward from Cape St. Elias, indents the coast about two miles to the south of the Katalla River. Strawberry Point, at the west side of the entrance, is low and bare at the end and

wooded towards the foot of the hill. There are several buildings of a railway camp just south of the point. Katalla is a post office on the northern side of the bay. There is always some surf on the beach, and with southeasterly or southwesterly winds landing is almost impracticable. Goods are discharged from vessels by means of a lighter. The necessary towing is done by launches. Our vessel, when I was at Katalla in 1914, cast anchor about one and a half miles from town, and we were put ashore on a gasoline launch named the Cordova. The boiler of the wreck of the Portland can be seen at low water. On the east branch of Katalla River about five miles from Katalla there are oil works which supply local boats with oil, gasoline, and distillates.

Controller Bay is formed by Okalee Spit and Kayak Island on the south and Wingham and Kanak islands on the west; for some distance back from the eastern shore the land is but slightly above high water and is broken by many streams. The bay is filled by flats between which are two principal channels, one from Kayak Entrance to the northern end of Kayak Island, and Okalee Channel.

Point Manby is low and wooded back to Malaspina Glacier. Sitkaga Bluffs are about four miles long, and are formed by Malaspina Glacier, which at the bluffs comes to high water mark but does not here discharge into the sea. From Sitkaga Bluffs, the glacier recedes from the coast about four miles up the Yahtse and Yana rivers, and then comes to the crest again at Icy Cape. John Muir says: "The Malaspina Glacier is the largest of the Alaska glaciers, covering one thousand five hundred square miles. It has a front of fifty miles on the sea and runs back thirty miles to the St. Elias range from which it is fed." Icy Bay has been



ICY BAY AND MOUNT ST. ELIAS
From Vancouver's Voyage of Discovery

formed by the recession of an arm of Malaspina Glacier, which discharges into the bay; there are large quantities of drift ice, at least during the summer. Depths of six to eight fathoms extend in places about five miles off the entrance. The entrance points are low spots, and the depths between them and in the bay are not known; the west side of Icy Bay appears to be shallow for a distance of at least one half mile from the shore, judging by the stranding of comparatively small bergs. Small ice masses are generally so packed along the shores that boats find it difficult to make a landing, especially as the ice grinds together when moved by the ocean swell which enters the bay.

From Icy Bay to Cape Suckling the beach is remarkably even, with no irregularities except Unbroken Reef and Yakatsaga Reef. There are numerous small streams, the larger ones with lagoons and shallow bars at the entrance. The streams are dangerous to cross because of quicksand in places in their shifting channels. The coast is low and wooded and backed by ice fields and glaciers.

Mount St. Elias is eighteen thousand and twenty-five feet high, and at the top is a massive pyramid with a shoulder on each side, as seen from the southward. Cape Suckling is low and wooded. Lying two miles northwestward of the Cape and one mile inland is the end of a prominent mountain ridge which extends about eight miles in a northeasterly direction, with elevations of fifteen hundred to twenty-five hundred feet. Three bluffs about one hundred feet high lie one and a half to three miles westward of Cape Suckling. Okalee Spit, forming the south side of Controller Bay, is low, bare sand with dunes, seven miles long in an east and west direction. Kayak Island is

seventeen and a half miles long, has peaks twelve hundred to fourteen hundred feet high, and slopes gradually to the northern part, which is low and wooded. Cape St. Elias, the south end of Kayak Island, is an important and unmistakable land mark. It is a precipitous, sharp, rocky ridge, about one mile long and one thousand six hundred and sixty-five feet high, with a low wooded neck between it and the high parts of the island further north. About one quarter of a mile off the cape is the remarkable Pinnacle Rock, four hundred and twenty-four feet high. A light was maintained on this rock pending the completion of a lighthouse on the cape.

Yakutat Bay has its entrance between Ocean Cape and Point Manby, where it is sixteen miles wide. It has a north direction for fifteen miles further to Point Latouche, where it is three miles wide. The continuation northward is known as Disenchantment Bay. Yakutat Bay is important as affording the best anchorage between Cape Spencer and Prince William Sound. It is clear of islands and dangerous shoals, except along its eastern shore from Ocean Cape to Knight Island. The depths of the bay are irregular, ranging from seven fathoms at two miles westward of Khantaak Island to one hundred and sixty-seven fathoms near Point Latouche. Disenchantment Bay, from Point Latouche, continues Yakutat Bay northward for about ten miles to Hubbard Glacier. Russell Fiord is an arm extending twenty-eight miles southeastward from the head of Disenchantment Bay. Nunatack Fiord extends seven miles northward from Russell Fiord at ten miles above Disenchantment Bay. Haenka Island lies about four and a half miles northward of Point Latouche. Osier Island is close to the turning

point from Disenchantment Bay into Russel Fiord. Point Manby, the western point at the entrance to Yakutat Bay, is low and wooded. There is usually a heavy surf on the beach, rendering it dangerous for boats to land. The great Malaspina Glacier descends to within about four miles of Point Manby. The ice in Yakutat Bay comes from Turner and Hubbard glaciers at the head of Disenchantment Bay and from Nunatack Glacier at the head of Nunatack Fiord. It is usually quite thick from Point Latouche to Nunatack Fiord, but at times it is scarce; occasionally it banks on the western shore of the bay as far south as Point Blighni; occasional pieces find their way as far south as Ocean Cape and Point Manby, and scattering pieces are usually found in the middle of the bay.

De Monte Bay has its entrance on the east side of Yakutat Bay, between Point Carrew and Khantack Island, and two miles north of Ocean Cape. The bay is one and a half miles wide at the entrance and extends to Yakutat, where the bay turns north northwest and is called Yakutat Roads, which is the anchorage used by vessels.

Yakutat is a post village with a sawmill on the north side of the eastern end of De Monte Bay and on the east side of Yakutat Roads. There is a mission school and dwellings, a small Indian village, and a store. At three-eighths of a mile eastward of the mission is a fish cannery and wharf with seventeen feet of water at the end. Some of the mail steamers call at Yakutat; ours did so both going to and returning from Cook Inlet. On the return trip our vessel took on board the summer's output of the cannery, and in doing so spent a good portion of the day. This gave us a good chance for investigation and study. Miss Dora Keen, the

celebrated mountain climber and glacier student, had come aboard our vessel at Valdez, she having spent the summer in making a study of the mountains and glaciers of Alaska. I had the privilege and pleasure of forming her acquaintance, and on her return to her home in Philadelphia, she sent me copies of many of her most valued photographs. At Yakutat we made investigations together, and in doing so visited the Indian village and mission. The village is located back of a beautiful beach, and the mission was in charge of Reverend E. M. Axelson, a Swedish evangelist. In the afternoon we visited the Indian burial ground, located across the bay on a small, marshy peninsula – seemingly a most unfit place for a graveyard. It was grown up in tall swamp grass and bushes and was not unlike other Indian burial places that I had seen. Most of the graves were enclosed with marked head boards and grave stones. One grave stone was marked, “Jim-Kar-Da-Cak died Jan. 15, 1847.” Another, “Mary Wuke-Dee-Ad-Fee died at Yakutat November 1910, aged 35 years.” One enclosure was well-constructed of dressed boards and was lighted on all sides with glass. Evidently it was the grave of a child, for on the inside were displayed the playthings of a child: a table with a child’s dishes on it ready for a meal, also a phonograph. We were taken across the bay in a gasoline launch by William Gray, a squaw man whom we first met at his home in the village, where he introduced us to his Indian wife and children. They were well appearing people and he seemed very proud of them. He charged us nothing for his services and seemed pleased to have the chance to aid us.

From Ocean Cape to Cape Spencer, a distance of about one hundred and twenty-five miles, the Fair-

weather Mountains lie on the mainland from about twenty miles northwestward of Cape Spencer to Aleck River. These mountains are snow-covered, have elevations from ten thousand to over fifteen thousand feet, and present a spectacle of great grandeur. From Aleck River to Yakutat Bay the mountains range from four thousand to six thousand feet high. There are numerous glaciers with terminal moraines along the coast. The most conspicuous are La Perouse Glacier, which comes down to the sea a few miles westward of Icy Point, its sea face being partly vertical, and at its highest point two to three hundred feet high; Yakutat Glacier, lies twenty-six miles eastward of Yakutat Bay, and the great ice field of Malaspina Glacier, westward of Yakutat Bay.

On June 17, the *Discovery* also quitted Port Chalmers and, two days later, anchored in Port Etches near a Russian establishment, at which they were cordially entertained. Port Etches is an inlet in the northwest end of Hinchinbrook Island, about four miles northwestward of Cape Hinchinbrook. The port is about seven miles long in a north-northeast direction and about one and a quarter miles wide. It is a secure anchorage, the best in Hinchinbrook Entrance, and is easy of access. The best anchorage for large vessels is in the middle abreast of Garden Cove, two miles from the head of the port, in twelve to thirteen fathoms of water with muddy bottom.

Hinchinbrook Island has two mountain ridges with elevation of two thousand feet, and a low valley between them running through from the head of Port Etches. The snow line is about one thousand feet above the sea, and the summits of the island are bare. Northward of Cape Hinchinbrook the seaward face

of Hinchinbrook Island is steep, with rocky bluffs at the water for twelve miles to an open bight with a broad sand beach on the northwest side of Point Hunt. Cape Hinchinbrook is marked with a lighthouse and fog signal. Constantine Harbor is a lagoon on the northwest side of Port Etches, its entrance lying three miles northeastward of Porcupine Rocks. It is suitable only for small craft on account of its very narrow channels. Hinchinbrook Channel, between Hinchinbrook and Montague islands, is used by vessels entering Prince William Sound. It was through this channel that Vancouver sailed from Port Chalmers in Montague Island to Port Etches. Montague Island is high and mountainous and wooded to an elevation of about one thousand feet. At the north end are three prominent points forming Zaikof and Rocky bays.

In the evening of Tuesday, July 1, Vancouver with the *Discovery* passed Port Manby, and saw to the E.N.E. the islands that formed Port Mulgrave, for which they steered in quest of the Chatham. At ten o'clock at night they heard the report of a gun in the direction of Port Mulgrave, which was immediately answered, Vancouver concluding it to be fired from the Chatham; this conjecture proved to be correct, as by four o'clock on Wednesday morning, July 2, the *Discovery* was visited by Mr. Manby, the master of the Chatham, in one of the Kodiak Indian canoes, attended by two others. By a letter from Mr. Puget, Vancouver was advised that the Chatham had reached Port Mulgrave on June 29, having completed the examination of the continental shore from Cape Hinchinbrook to that station.

Owing to unfavorable weather, the *Discovery* drifted too far to the eastward of Cape Phipps to fetch into

Port Mulgrave, so Vancouver had her approach as near to Cape Phipps as the wind would allow, and, after firing some guns to announce their situation to the Chatham, bore away along the coast, which from Port Mulgrave was composed of a low border, well wooded, extending from the base of the mountains into the sea. On the morning of July 3, a strange sail was discovered to the eastward. She proved to be the Jackall, commanded by Mr. Brown. This vessel had visited this region as a tender to the Butterworth, then under command of Mr. Brown, but at the conclusion of the season of 1793 she had been dispatched to England, with directions to fish for whales and seals in passing through the Pacific Ocean, and at States Land, where Mr. Brown had formed a temporary establishment. With this vessel and the Prince Lee Boo, his other tender, Mr. Brown had gone to Canton, from where he had departed on February 24, and after having a very tedious passage, he had reached this coast on the 30th of the preceeding month, with the intention of proceeding to Cross Sound. He offered to accompany Vancouver thither.

Both the wind and weather was very unpleasant; the former settled on Friday, July 4, in a southerly gale, attended by a heavy swell, with squalls, and dark, rainy weather, which reduced them to close-reefed topsails. They separated from the Jackall and attempted to beat to the windward but lost ground until the 6th; when, after some hours of calm, they were favored in the morning with a gentle breeze from the northwest and a return of pleasant weather. They had now an extensive view of the sea coast, stretching by compass S. 77 W. to N. 86 E., within which limits Mount St. Elias and Mount Fairweather rose magnificently con-

spicuous from the still continued range of lofty snowy mountains.

This lofty range of mountain now gradually approached the seaside; and to the southward of Cape Fairweather it might be said to be washed by the ocean; the interruption in the summit of these very elevated mountains mentioned by Captain Cook was likewise conspicuously evident to them as they sailed along the coast and looked like a plain composed of a solid mass of ice or frozen snow, inclining gradually towards the low border; which, from the freshness, uniformity, and clean appearance of its surface, conveyed the idea of extensive waters having once existed beyond the then limits of their view, which had passed over the depressed parts of the mountains, until their progress had been stopped by the severity of the climate, and that by the accumulation of succeeding snow, freezing on this body of ice, a barrier had become formed that had prevented such waters from flowing into the sea. Vancouver adds: "I do not however mean to assert, that these inclined planes of ice must have been formed by the passing of inland waters into the ocean, as the elevation of them, which are many hundred yards above the level of the sea, and their having been doomed for ages to perpetual frost, operate much against this reasoning; but one is naturally led on contemplating any phenomenon out of the ordinary, to form some conjecture, and to hazzard some opinion as to its origin, which on the present occasion is rather offered for the purpose of describing its appearance, than accounting for the cause of its existence."

Vancouver proceeded up Cross Sound, which was a very spacious opening in the coast; and as Captain Cook very correctly observed, branched into several

arms, the largest appearing to take a northerly direction. On the surface of water in the sound were a great number of small, though hard pieces of loose ice, some of which, at first sight, occasioned considerable alarm, from their strong resemblance to sea-beaten rocks, just level with the surface of the water, which had the appearance of breaking over them with great violence and presented the navigating of this inlet as an extremely intricate and difficult task; especially so as no bottom could be reached with eighty and ninety fathoms of line, close to these apparent dangers. A little time, however, soon discovered them to be nothing more than dark colored and dirty pieces of ice.

On the morning of July 9, Mr. Whidbey set out with three boats with instructions to go back to Cape Spencer and continue thence their survey of the continental shore. This party returned on July 18, and made their report. In what is now known as Taylor Bay their further progress had been stopped by an immense body of ice extending from shore to shore (Brady Glacier). Subsequently they visited Dundas Bay, where their boats were greatly endangered by floating ice. Thence the Whidbey party proceeded through a channel (Icy Strait) from two to three miles in width, between the continental shore and an island (Lemesurier).

Icy Strait and Cross Sound are the northernmost of the waterways connecting the inside passage of south-east Alaska with the Pacific Ocean, and separate the mainland, between Point Couverden and Cape Spencer, from Chickagof and Yakobi islands between Point Augusta and Cape Bingham. They are important as forming a connecting channel for vessels bound westward from the inland passages and are generally used.

I have passed through them a number of times. Glacial ice from Glacier Bay is generally present in the passage and may always be expected, and it is dangerous at night or in thick weather from Point Adolphus to Cape Spencer. The distance from Chatham Strait through the passage to the Pacific Ocean is about sixty miles, the average width is four to seven miles, but in some places the width is much lessened by the islands. Cape Bingham forms the southeast point at the entrance to Cross Sound. The point is rather low, rocky, and bordered by small inlets.

The present famous Glacier Bay has its entrance on the northern shore of Icy Strait. Vancouver says of this region: "The space between the shores on the northern and southern sides seemed to be entirely occupied by one compact sheet of ice as far as the eye could distinguish." It is believed, therefore, that Glacier Bay must have been formed by the recession of the ice since Vancouver's time. John Muir says: "Glacier Bay is undoubtedly young as yet. Vancouver's chart made only a century ago shows no trace of it, though found admirably faithful in general. It seems probable, therefore that even then the entire bay was occupied by a glacier." This bay is about thirty-five miles long to the head of Muir Inlet and fifty-two miles long to the head of its northwest arm, and varies in width from two miles at Beardslee Island to nine miles at its widest part above Willoughby Island. From Point Gustavus to Willoughby Island, the eastern shore, including Beardslee Island, is low for a short distance back; above Willoughby Island both shores of the bay are steep and high. Numerous discharging glaciers enter the bay, and glacial ice is always present, sometimes in dangerous quantities.

The bay is frequently entered by steamers for the purpose of viewing the glaciers. I voyaged through it and Muir Inlet, Tuesday, August 19, 1913, for the purpose of visiting Muir Glacier. The bay and inlet were full of floating ice. At thirty minutes past eight o'clock, I landed on shore at the base of Muir Glacier, and at nine-thirty o'clock had the pleasure of being on the glacier that I had come so far to see. The constant booming of the ice falling into the extension of the inlet that was being made was awe-inspiring. All around us were the evidences of the rapid receding of the glacier.

This glacier was discovered by John Muir in 1879. Of its discovery he says: "On our way down the coast, after examining the front of Geikie Glacier, we obtained our first broad view of the great glacier afterwards named the Muir, the last of the grand company to be seen, the stormy weather having hidden it when we first entered the bay. It was now perfectly clear, and the spacious, prairie-like glacier, with its many tributaries extending far back into the snowy recesses of its fountains, made a magnificent display of its wealth, and I was strongly tempted to go and explore it at all hazards, but winter had come, and the freezing of ice fiords was an insurmountable obstacle." Muir's second visit was made in 1880, concerning which he says: "Next morning at daybreak I pushed eagerly back over the comparatively smooth, eastern margin of the glacier to see as much as possible of the upper fountain region. About five miles back from the front I climbed a mountain twenty-five hundred feet high, from the flowery summit of which, the day being clear, the vast glacier, and its principal branches were displayed in one grand view. Instead of a stream of ice

winding down a mountain-walled valley like the largest of the Swiss glaciers, the Muir looks like a broad, undulating prairie streaked with medial moraines and gashed with crevasses, surrounded by numberless mountains from which flow its many tributary glaciers. There are seven main tributaries from ten to twenty miles long and from two to six miles wide where they enter the trunks each of them fed by many secondary tributaries; so that the whole number of branches, great and small, pouring from the mountain fountains perhaps number upwards of two hundred, not counting the smallest. The area of this one grand glacier can hardly be less than seven or eight hundred miles, and probably contains as much ice as all the eleven hundred Swiss glaciers combined."

Lynn Canal

From Icy Strait and Icy Passage the Whidbey party proceeded on up Lynn Canal and, on the morning of the 16th, reached its navigable limit, a wide shoal over which the water was found to be perfectly fresh. Along the edge of this shoal the boats passed from side to side in six feet of water, and beyond it the head of the arm extended about half a league, when a small opening in the land was seen about a fourth of a mile wide leading to the northwestward, whence a rapid stream (Chilkat River) washed over the shoal; but this was seemingly bounded at no great distance by a continuation of the lofty ridge of snowy mountains stretching eastward from Mount Fairweather. These mountains appeared to be a firm and close-connected range forever doomed to support a burden of ice and snow.

From up this brook (Chilkat River) came an Indian party of upward of a hundred persons, who gave Mr. Whidbey to understand that eight chiefs of great consequence resided there, and they solicited him with much earnestness that he should remain in that neighborhood some days, to give the chiefs an opportunity of paying him a visit. Their behavior was friendly, but Mr. Whidbey had a more important object to pursue than that of receiving new visitors, so declined the proposed civility, and returned down the inlet along the eastern shore, which was low, indented into small bays and coves, and appeared to be a border that extended from the base of the mountains that lie behind, and

which took a southeast direction four leagues and a half to a point that obtained the name of Point Seduction, in consequence of the artful character of the Indians who were said to reside in the neighborhood.

To the inlet thus examined by the Whidbey party, Vancouver later gave the name of Lynn Channel (now charted Canal) after the place of his birth, the town of Lynn in Norfolk.

The Whidbey party were joined on their way down the channel by a large canoe in which there were about twenty Indians, with a chief who assumed the character of king or principal chief over all the people residing up the brook. He introduced himself in a friendly and courteous manner, made Mr. Whidbey a present of a sea otter skin, and received a suitable return. This chief was a tall, thin, elderly man. He was dressed in a much more superb style than any chief they had hitherto seen on this coast and displayed a degree of state and personal dignity unusual amongst the chiefs of northwest America. His external robe was a very fine large garment that reached from his neck down to his heels, made of wool from the mountain goat, neatly variegated with several colors, and edged and otherwise decorated with little tufts, or frogs of woollen yarn, dyed of various colors. His head-dress was made of wood, much resembling in its shape a crown, adorned with bright copper and brass plates, whence hung a number of tails or streamers, composed of wool and fur wrought together, dyed of various colors, and each terminating in a whole ermine skin. The whole exhibited a magnificent appearance and indicated a taste for dress and ornament that the explorers had not supposed the natives of those regions to possess.

The very cordial manner of these new acquaintances

did not, however, prevent Mr. Whidbey from being on his guard, and knowing that there were many others in the neighborhood, he caused every one of his party to keep in the boats a little distance from the shore and gave particular instructions that the watch should be vigilantly attentive. At dawn, it was discovered that another large canoe had found its way into the cove, while several others, all full of Indians, were advancing at no great distance, and those already in the cove were in motion towards the boats. Mr. Whidbey took such instant precautions as were most likely to repel any attempt that might be in contemplation. By the time the explorers had increased their distance a little from the shore and were prepared to act on the defensive, the chief who had shown such marks of friendly attention during the preceeding day and evening was, with his followers, alongside the yawl, pursuing a mode of behavior very different to that which he had before displayed. He now waited for no invitation, but on coming alongside, he jumped into the yawl, seemingly with no other intent than that of plundering the boat. Fortunately, however, the awning much impeded his progress and prevented the rest of his companions from following his example before he was obliged to retire and put off with his canoe. By this time, the other canoes had divided their forces, and had gone against the other two boats, where they experienced a similar repulse. Their numbers had now increased to at least two hundred, yet seeing that the Whidbey party were so well-prepared, they did not make any further attempt and seemed to content themselves with vaunting only. One chief in particular became very valiant; he was of the last party that had arrived, and was in a large canoe full of Indians, who were well-provided

not only with spears but with seven muskets and some blunderbusses. He advanced and hailed the yawl with a speaking trumpet, which he held in one hand and had a spy glass in the other; a powder horn was flung across his shoulders, and a clean, bright blunderbuss was lying near him, which he frequently took up and pointed at Mr. Whidbey in such a manner as evidently showed that he was no stranger to the use and management of such weapons, while by his adroitness in the use of the trumpet and telescope it would seem that he had not been unsuccessful in copying this part of maritime education. Whidbey's boats remained for a short time nearly stationary, waiting for their assault, but this they all thought proper to decline. By Mr. Whidbey having directed his course toward mid-channel, the canoes were drawn from the shore into the middle of the channel where they were less liable to be troublesome, as it had appeared that on all such occasions they were desirous of securing a retreat by being near to the rocks or woods. The whole of the Indian party followed the boats for about three miles, when they gave up the pursuit and retired.

The Whidbey party quickly pursued their route along the eastern shore. At breakfast time a point, by Vancouver called Point St. Mary's, was reached in latitude $58^{\circ} 43\frac{1}{2}'$, longitude $225^{\circ} 2'$, forming the north point of a bay, which Vancouver named Berner's Bay. This was about four miles across, in a direction S. 20 E. about five miles deep to the N.N.E. From the south point of this bay, which Vancouver called Point Bridget, the continental shore took a direction S. 26 E. and having advanced about ten miles passing a small island, the severity of the weather obliged them to take shelter among a group of small islets. Here they were de-

tained until eight o'clock in the forenoon of July 18, when the party resumed their examination in (Favorite) channel, difficult to navigate, even for boats, it being much incommoded with numberless rocks between this group of islets and the continent, which still continued in the direction before mentioned. In passing through this intricate navigation, smoke and many Indians were seen in various directions. After advancing about five miles, they came to a small bay where the shoal terminated. Here they stopped to dine. After dinner, accompanied by a canoe and twelve Indians, the party steered up Stephens Passage to Gastineau Channel, but their progress, in consequence of very bad weather, was rendered extremely slow and, towards evening, they had the mortification of being joined by another canoe full of Indians. As the day declined, the party anxiously looked for some place of shelter and endeavored to get rid of the Indians by firing some muskets over their heads; but instead of this measure having the desired effect, it seemed only to make them more daring and encouraged them to advance nearer the boats. Thus unpleasantly circumstanced, the explorers continued at their oars until ten o'clock at night, without having gained more than four miles from the place where they had dined and without the most distant probability of the Indians taking their leave. Although this branch had every appearance of being closed not far ahead, yet as Mr. Whidbey wished to ascertain that fact positively, the party steered for the shore with the intent of their passing the night; this the Indians perceived, made their way thither, and got their spears couched ready for the party on landing. To avoid firing upon them, the party remained on their oars all night. So far as Gas-

tineau Channel had been discernible before dark, there was every reason to think its termination had been seen; but should the party have been deceived, it was here too rocky and dangerous to be considered as navigable for shipping, and for that reason unworthy of further examination, at the risk of a serious dispute with those troublesome people. These considerations determined Mr. Whidbey to return to (Lynn Canal) the main channel, where, about dawn of day, July 19, the boats arrived at a point which obtained the name of Point Retreat. Here they stopped to take some rest, and having breakfasted, Mr. Whidbey, although in some measure departing from the scrupulous exactness with which the survey had hitherto been conducted, became satisfied that the branch he had thus quitted was barely navigable for boats, and therefore he pursued his researches in Lynn Canal about sixteen miles, along the eastern shore, which took a direction S. 9 E. to a point by Vancouver called Point Marsden. This shore was very moderately elevated, covered with fine timber chiefly of the pine kind, and terminating at the water side with alternate steep, rocky cliffs and small, sandy bays, with a few detached rocks and islets lying near it. On July 20, they advanced about ten leagues farther, still finding the eastern shore compact, and the country of a similar description to that they had passed the preceding day. Here at a point in latitude $57^{\circ} 37'$, longitude $205^{\circ} 29'$, which Vancouver called Point Parker, the party took up their abode for the night. In the morning of July 21, the weather being fair gave them a distinct view of the surrounding region. It was seen that they were advancing in (Chatham Strait) a very spacious channel to all appearance free from interruption. Its west-

ern shore, distant seven miles, appeared to consist of an extensive stretch of land or a large group of islands which seemed to form channels that took a westerly direction towards the ocean. Vancouver honored this country with the name of King George III Archipelago.

A league to the S.E. of Point Parker was an opening about an eighth of a mile wide, where many of the natives in their canoes were assembled. From the treatment the party had lately received, it was necessary that their firearms should be in readiness, and as some had been loaded for many days, Mr. Whidbey ordered them to be discharged into the air, which soon after produced a return of nearly an equal number of discharges from the Indians on the shore. But as the boats approached the opening the canoes were all hastily paddled off by the natives and soon disappeared. In the entrance of the opening five fathoms of water was found, and after advancing half a mile it proved to be only a shallow, rocky place. On each side of the entrance some new habitations were being constructed and for the first time during their intercourse with the northwest American Indians, the explorers found some square patches of ground in a state of cultivation, producing a plant that appeared to be a species of tobacco, which, they understood, was by no means uncommon amongst the inhabitants of the Queen Charlotte Islands. On the return of the boats the Indians again made their appearance in a large body, headed by a chief who manifested a friendly disposition, by frequently taking up and laying down his musket and making signs that those in the boats should do the same. On this being done, he sent a young man dressed in a scarlet coat and blue trousers to invite the party on shore. Mr. Whidbey declined the invitation, but gave

the messenger to understand that they wanted some fish. This request was granted with some small herrings, and no sooner was this done than the whole tribe, numbering upwards of five hundred persons of all ages, were in motion and crowding about the boats, but, when requested to do so, they returned to the shore. The chief followed his people, and sent an abundant supply of fish to the boats, for which kindness a handsome reward was sent back.

Mr. Whidbey pursued his researches, and about ten miles from Point Parker a projection was passed which Vancouver called Point Samuel. This formed the north point of Hood's Bay, which was about a league and a half across, having some islands nearly in its center. On the south point of this bay the party stopped to breakfast and were visited by fourteen canoes from the Indian tribe which they had last seen, in none of which were more than four persons. From these people, Mr. Whidbey understood that the western coast was composed of several islands, which they had lately passed through and had traded with vessels in some port on the exterior coast, from whence they had procured most of the European commodities they had about them, consisting chiefly of wearing apparel, of which coats and cloth trousers seemed to be preferred to every other article, excepting arms and ammunition; copper and iron being reduced to a very inferior value. Quitting this station, Mr. Whidbey continued his survey along the eastern shore, still in the direction of S. 7 E. Two smaller bays were passed and off the points of each of them, islets and rocks were seen lying at a little distance. In the evening Point Caution was reached in latitude $57^{\circ} 13'$, near which the party rested

for the night in a small cove. Here they experienced the oceanic swell rolling from the southward. After proceeding the next morning thirteen miles, they arrived at Point Gardner, whence a clear view of the sea was gained, between the high land of Cape Decision and the south extremity of Baranof Island.

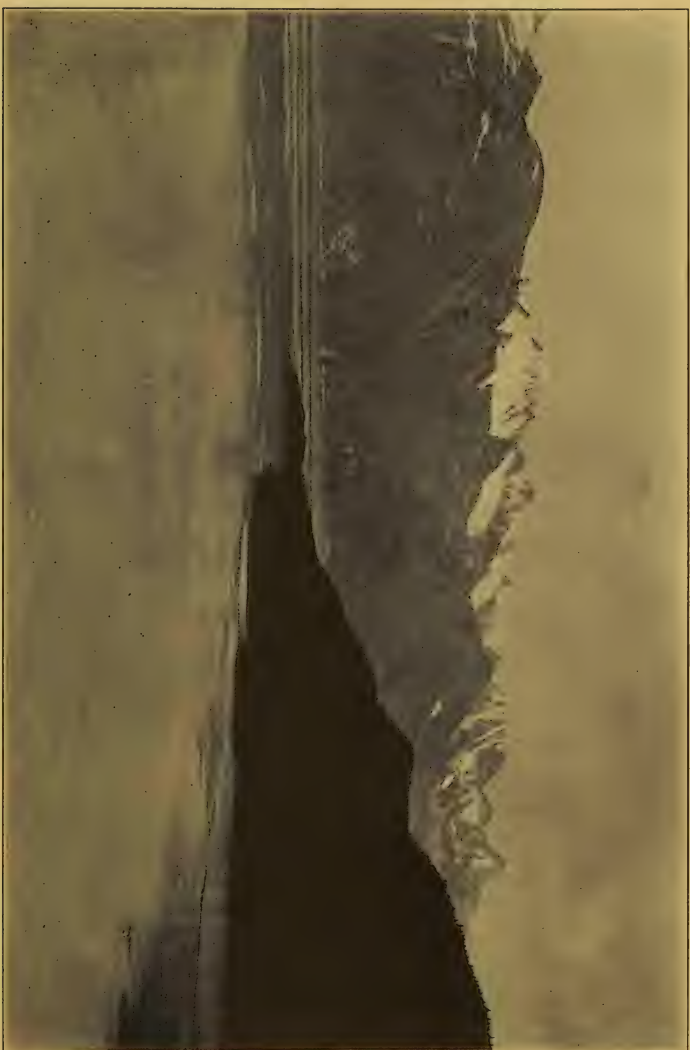
At a point which Vancouver named Point Townsend the Whidbey party turned back toward Cross Sound, distant more than one hundred and twenty miles. After various adventures they reached the ships in safety, having in about sixteen days completed a traverse of upwards of five hundred miles.

Lynn Canal, which had been thus explored, is the extension of Chatham Strait above Point Couverden; it has a N.W. $\frac{1}{4}$ N. direction about fifty-five miles to Point Seduction, where it divides into two arms, called Chilkat and Chilkoot inlets. At Point Couverden, Lynn Canal is five miles wide; from Point Howard to Ralston Island about three miles; thence it averages six miles wide to Point Seduction. The canal is nearly free from dangers, and the water is generally very deep. The shores are, as a rule, very high and wooded, with many bare mountain peaks.

Tarr and Martin in their *Alaska Glacier Studies* say: "On the east side of this fiord a group of glaciers descend from the snowfield of the Canadian coast range, the better known valley glaciers, named in order from Juneau northward to Skagway, the Mendenhall, Herbert, Eagle, Meade, and Ferebee glaciers. Besides these large glaciers that bear names there are as many glaciers of equal size that are yet unnamed because they are not seen from Lynn Canal, as for example the five glaciers terminating ten to fifteen miles back from

Lynn Canal in the valleys draining to Berners Bay. There are also hundreds of minor glaciers, such as the Lemon Creek Glacier and others near Juneau, and the glaciers on the north side of Lion's Head Mountain, Berners Bay. . . . On the west side of Lynn Canal a series of glaciers descend from the slopes of the St. Elias range, though none reach sea level. These include a number of valley glaciers in the region drained by the western tributaries of the Chilkat River, including the Knapp-Leslie, Jarvis, Le Blondeau, Takin, Bertha, and Garrison glaciers, and the glaciers whose streams flow directly to Chilkat Inlet or Lynn Canal, such as Rainbow Glacier; the well known piedmont bulb of Davidson Glacier, and a series of unnamed tongues, some of which are through glaciers descending from the snowfields that also feed Muir Glacier on the west side of the same range." Davidson Glacier is on the left side as we go north through the canal and comes down nearly to the channel like an immense river of ice, two or three miles in width, and is seamed by high chasms, the edges of which deepen into an intensely deep blue. It was named in honor of Professor George Davidson, who was one of its earliest explorers.

Chilkat Inlet, the western arm at the head of Lynn Canal, is nine miles long. At two and a half miles from Point Seduction the arm is narrowed to one quarter of a mile by Glacier Point, the moraine of Davidson Glacier; it then expands to two and a half miles, and maintains that width for some distance, narrowing to two miles at its head. Davidson Glacier, on the west side at the entrance to Chilkat Inlet, slopes to the water's edge, from which it is separated by a narrow wooded moraine called Glacier Point. The



LYNN CANAL FROM FORT SEWARD, ALASKA, 1914

edge of the McClellan Flats at the mouth of Chilkat River lies about one mile northwest of Pyramid Island. There is a dismantled cannery on it three-quarters of a mile northwest of the island. There is a cannery and wharf with about fourteen feet of water at its end in the small cove five-eighths of a mile from the northwest end of Kochu Island. Pyramid Harbor is a bight in the southwest shore S. by W. from Pyramid Island. There is a cannery on the south side of the harbor with a small cannery wharf. Chilkat River is a shallow stream about fifty miles long; it runs in a general E.S.E. direction, and at its mouth is about two miles wide. This mouth is so choked with sandbars as to be practically closed for anything except canoes. The village of Klukwan may be considered as the head of boat navigation, though small canoes may go somewhat farther. There is a wagon road up the river starting from Haines.

Chilkoot Inlet, the eastern arm at the head of Lynn Canal, is thirty-five miles long from Point Seduction to the head of Taiya Inlet. It has a N.W. by W. $\frac{1}{2}$ W. with a uniform width of about one mile. Chilkoot Inlet has on its east side, and Taiya Inlet on both sides, lofty mountains with glaciers in their gorges. The mid-channel depths are great throughout. Battery Point, four miles above Flat Bay, is low and marked by a light. This point is the center of a marked local attraction which affects the compasses of passing vessels. On the eastern shore, opposite Battery Point, is deep water and the mouth of the Katzeheim River. Portage Cove, a most beautiful body of water, on the southwest shore, two and a half miles west of Battery Point, affords the best anchorage and shelter in Chilkoot Inlet. The an-

chorage is about one-fourth of a mile off the wharves in twelve to fifteen fathoms of water with soft bottom. Northerly winds blow home and make some little sea. From the anchorage the water shoals gradually to a gravel and boulder beach, which is bare some distances out at low water, and the water is shoal about two hundred yards from the shore. This is one of the most beautiful beaches that I have seen. I have visited Portage Cove a number of times, and on account of the disabling of our vessel, I spent the whole of Sunday, September 20, 1914, there. Fort Seward is beautifully located on this cove and fronts the beach and has a background of snow-capped mountains, the bases of which are beautifully wooded. The Peterson, a small local steamer, commanded by John Campbell was in service between Skagway and Fort Seward when I was there. I formed the acquaintance of Captain Campbell and found him a jolly old "sea dog."

Haines is a mission town on the west side of Portage Cove, one-half of a mile northward of Fort Seward. It is an outfitting and starting point for the Porcupine mining district on a branch of the Chilkat River about forty miles from Haines, which is reached by a road along the south side of the Chilkat River. Mining provisions in limited quantities can be obtained. When I was there, a large sign-board across the main street, had inscribed upon it, "Haines, Alaska, is the natural gateway to Porcupine, Rainy Hollow, White Run and Tanana valley, have Vast Resources of gold, silver, copper, lead, iron, and coal. Large areas of farming, grazing, and timber lands. Best climate of any city or town on the coast of Alaska." What more could be desired? At the time of my visit, Haines had a pop-



VIEW OF FORT WILLIAM H. SEWARD, ALASKA, 1914

ulation of about three hundred, including whites and Indians. Most of the latter were at the cannery seven miles distant; those at home were quietly observing the Sabbath. I found but one place of business open and that was a drug store. This to me was impressive since it was in this region that Vancouver found the most savage and treacherous Indians on the coast of north-west America. This reformation and change may be credited to the good offices of the mission established at this place by the Presbyterian denomination. I observed that there was a good two-story school building in the outskirt of the town, with the stars and stripes floating above it. There is a sawmill one-half mile northward of the town. The wharf has about seventeen feet at its end and there is a boat landing. A local steamer running between Skagway and Juneau stops here, and there is cable communication. Between Haines and the army post is a graveyard with eighty enclosed grave-lots. The enclosures were well-built of iron railings; some of the graves were marked with grave stones inscribed with totemic designs. One reads:

Johnnie Tom
Born
Mar. 15, 1895
Died
Aug. 18, 1901,
Aged
5 years.

Little time on earth he spent,
Till God for him his angels sent.

The western coast of Chilkoot Inlet is five miles long and receives at its head a short stream which drains

Chilkoot Lake. At the mouth of the stream is a flat, nearly half a mile wide. Anchorage can be had near the head in twenty-five to thirty fathoms of water with soft bottom. There is a cannery on the northwest side at the head, and another on the south side one mile inside the entrance. Taiyasaaka, five and three-quarter miles N.W. $\frac{3}{4}$ W. from Battery Point, is a small harbor at the foot of Ferebee valley.

Skagway

Skagway town is in the valley at the mouth of the Skagway River at the head of the small bight on the east side of the Taiya Inlet ten miles above the entrance. It is the terminus of the White Pass and Yukon Railway. This famous road was built by the "Three H's" – Heney, Hawkins, and Hislop. It is credited with being one of the most wonderful engineering feats of the world. On April 10, 1896, Mr. E. C. Hawkins, then chief engineer of the White Pass and Yukon Route, arrived at Skagway, with his crew of engineers and men, and made a preliminary survey. He found that the maps and reports which had been furnished him were worthless and misleading. It was found that the engineering problems incident to constructing of the railway were much more difficult than had been anticipated. Five different surveys were made and, strange to say, a portion of each survey was adopted in building the line. On May 27, men, horses, and railroad material were landed at Skagway and, on the morning of May 28, work was commenced. The work was pushed with such vigor and promptness that, on July 21, the first trains were put in use and run for about a distance of four miles out of Skagway. This was quite an historic event, as it was the first railroad train carrying passengers ever run in Alaska, or so far north anywhere on the American continent. On August 25, the track was completed to what was then known as Heney Station, a point thirteen and a half miles from Skag-

way. Below this station down in the valley was located what was then known as White Pass City. Thousands of men en route to the gold fields were camped there at various times and their supplies were sent down the mountain side by gravity on an improvised railroad track. On February 18, 1899, the track was laid to the summit of White Pass, a distance of about twenty-one miles, and, on the 20th, freight and passenger trains were operated.

On July 6, 1899, the railroad was completed to Lake Bennett, a distance of forty-one miles. From Lake Bennett steamers ran to the head of Miles Canyon; from there a portage was made around the canyon and White Horse Rapids, to a point a mile or two below the rapids, and then the freight and passengers were again transferred to another line of river steamers to Dawson City. In order to facilitate travel and to obviate the transfer by portage around the Canyon and the Rapids, the line was extended from Lake Bennett to a point about two miles below White Horse Rapids to what is now the city of White Horse. This latter extension was completed from the foot of Lake Bennett to White Horse in June, 1900, and while the work along Lake Bennett was going on, the trains were ferried from the head of the lake to what is now known as Carcrass. On the morning of July 30, 1900, the road along Lake Bennett had been completed and on the same day through trains from Skagway arrived at White Horse.

To anyone who has traveled from Skagway to White Horse, thence on to Dawson, it is hardly necessary to point out the immense benefit the construction of this railroad has been, not alone to Atlin and the Klondike country but to a very large portion of the Yukon valley

in Alaska. The trip from Skagway to the summit, which formerly took days to accomplish, is now made in a little less than two hours. The railroad runs beyond Miles and White Horse Rapids, thus affording passengers an excellent view of the canyon. These two places, which caused the early Klondikers so much trouble and often times death, have now become historical.

My first round trip over this railroad to White Pass was made Thursday, July 27, 1911, at a cost of five dollars. A tourist's train was waiting for us at Moores' wharf, and we transferred from the boat to the train. The making of the trip was a wonderful experience — one not to be forgotten. Mr. P. E. Kern, a dealer in nugget jewelry, souvenirs, and curios, was aboard with his wares and as a guide. He certainly was an obliging gentleman, and, as I subsequently learned, one of the most enterprising citizens of Skagway. I found "Kern" painted in every conceivable place about the town and on the rocks of the mountainside. From Observation Point No. 1, we had a most beautiful view down the valley and out over the "Salt Water," also, the Klondike trail of '98 following up the mountain side, along which were seen many deserted cabins of '98; also, the deserted White Pass City, which in 1897-1898 had a population of five thousand people who were making their way to the Klondike. Near this point the railroad company had to make five miles on a switchback in order to secure a four and a half percent grade. We passed "Dead Horse Gulch," where our guide assured us that in 1897-1898 three thousand dead horses were to be seen. From Observation Point No. 2 we could again see Skagway and "Salt Water." We crossed the cantilever bridge at the dizzy height of two hundred

and fifteen feet. In making an excavation for a pier for this bridge they found glacial ice at a depth of eighty feet. We arrived at the summit at 12:45 P. M., and at 1.45 P.M. drank water from a spring, said to be the fountain head of the Yukon River. Here I saw the two monuments marking the division line between Canada and the United States. The register at the summit showed people for the day from New York, Cleveland, Indiana, Chicago, Great Falls, Montana, Winnipeg, Victoria, Vancouver, Waterfalls Look, Melbourne, Stockholm, and Paris.

Taiya Inlet leads from Chilkoot Inlet at the head of Lynn Canal to Dyea. Of this inlet Mrs. Higginson says: "It is a narrow water-way between high mountains which are covered with a heavy growth of cedar and spruce. They are crowned, even in summer, with snow, which flows down their fissures and canyons in small but beautiful glaciers, while countless cascades foam, sparkling, down to the sea, or from such great heights that the beholder is bewildered by their slow, never ceasing fall." The wind blows almost constantly through Lynn Canal and Taiya and Skagway inlets, and at times it willows, making dangerous navigation.

October 18, 1918, the Canadian wireless service at Victoria picked up the following message from the United States wireless station at Juneau:

"Princess Sophia driven across reef last night. No survivors. Seventy-five in crew. Two hundred and sixty-eight passengers. Everything possible was done. Terrible weather prevails." This was the worst marine disaster in the history of the Pacific coast. The vessel was bound southward from Skagway, and was lost at Vanderbilt Reef. This reef is four miles from Sentinel Island lighthouse, and is a low rock covered at

three-quarters flood. Those on board the *Princess Sophia* were Alaskans, who boarded the steamer at Skagway after coming up the Yukon River from the interior. They left the river at White Horse and from there came by train to Skagway. It is understood that they had large quantities of gold with them. The storm sprang up Wednesday, October 17, and the winds whipped down the long, narrow Lynn Canal with hurricane force. The *Sophia*, in the path of the gale, was pounded against the rocks. On account of the danger of stranding, the ships that had come to rescue her, did not dare to go near her. Life boats were impossible, although the shore was not many yards away. During the night the gale increased in fury and lifted the *Sophia* up, dragging her across the reef and sending her to the bottom early Thursday morning. Captain Locke, master of the *Sophia*, was in command of the *Princess Royal* when I made my first voyage through Lynn Canal to Skagway in July, 1911.

Dyea, at the head of Taiya Inlet, is an abandoned mining town. The building of the town was the outgrowth of the Klondike gold excitement of 1897-98. Immediately before the building of the White Pass and Yukon Railroad, it had a reported population of more than twenty thousand. It was then the headquarters to the Chilkoot Pass, which led over the mountains to the golden Klondike country. Wonderful and fabulous stories have been told of the difficulties encountered and sufferings endured by those who made the passage of the mountains. The present condition of the pass is graphically told in the following account of a retracing of it in 1913: "Burnett Ashley, Charles Rapuzzi, Teddy Tyler, Clifford Beaver, A. J. Baker, and George Black formed a party of six young men

who left Skagway on July 15, for a pleasure tramp over the old Chilcoot trail to Lake Bennett. They went as far as Dyea in the launch *Star*. Here Emil Klatt, the lone inhabitant of the once populous port of gold, put them across the Dyea River a little distance above the old town. They then took the old trail, following it as best they could, often having to ford rivers and smaller streams, but finally came to Canyon City. This place was entirely deserted; the old power house and some of the other buildings, however, still remain. They camped here over night. Sheep Camp was reached the next day at noon. Here again was a deserted city. The river had cut the town up considerably in its wanderings, but several of the old buildings still remained. They decided to camp here for the night, and were joined at this time by Clarence Achison, who left Skagway twelve hours later than they did. Next morning the party, reinforced by Achison, started for the summit of the Chilkoot Pass. On reaching the scales, they found two of the old buildings still intact. They commenced the climb up the steep hill, which was plentifully supplied with snow. At the top they found a couple of mountain goats, which were quickly dispatched. Hunting around, they discovered two old Yukon sleds, and loading their additional plunder on to them, they slid down into Canada, landing on Crater Lake. The little lake was frozen over, with the exception of a small spot in the center. Here they camped and broiled goat steaks for dinner. It was pretty chilly around this spot, but they had had a strenuous day, so they stayed there all night. The next day they tramped around Long Lake, Deep Lake, and down the old trail, finally reaching the shore of Lake Lindeman, which is the real head of navigation on the



BIRDSEYE VIEW OF SKAGWAY, ALASKA, 1905

Yukon River. Here they caught some grayling, which were to be had in abundance, and varied their fare of goat meat. They hunted around Lindeman, but saw no game, although moose tracks were in evidence. They made camp for the night near Williams' Cove. The next morning they built a raft and sailed down to the one mile portage, which separates Lindeman from Bennett. Arriving here in three and one-half hours, they camped for the night in old Bennett City. The next day they walked over to the railroad station at Bennett, where they took the train for Skagway."

I visited Dyea, August 20, 1913. I had tried at other times to do so, but could get no one to take me because of the high wind in the inlet. Captain Louis Larson took me to the old town in his gasoline launch *Argo*. I paid him five dollars and thought the money well spent, for he served me well. I found the town in the sole possession of Emil A. Klatt, an old bachelor, who had been a "packer over the trail in 1899." He said he was looking for a wife, and if he found one he would make Dyea his future home, and that he would devote his time to gardening and stock-raising. He was a queer looking fellow, and I wondered if he could find a wife to live in seclusion with him, and I concluded he did not, for I am informed he has left Dyea. After I was at Dyea I heard that a Mrs. H. S. Pullen, about whom I shall have more to say, had purchased the place for a summer camp for transients.

I first visited Skagway, July 27, 1911. We landed at the Moore wharf at 10:30 A.M. As the boat came up to the wharf I noticed a woman on the wharf on a coal-black horse. She was attired in a full riding habit, topped with the conventional silk hat. She carried herself in an erect and queenly style and handled her

horse like a well-trained equestrienne. I inquired who she was and was told that she was Mrs. Pullen, the proprietor of the Pullen House, the leading hotel in Skagway. I went to the Pullen House and have always stopped there when in Skagway. By so doing I formed an acquaintance with Mrs. Pullen, whom I have found to be a very remarkable woman. By birth she is a Kentuckian. She and her husband moved to Cape Flattery where they succeeded in establishing a home and acquired considerable personal property. This was all lost except some horses and household goods. Then misfortunes discouraged the husband, who took sick and died, leaving Mrs. Pullen with three small boys to provide for. This was her condition in 1897 when the Klondike gold excitement became so prevalent. Mrs. Pullen caught the "gold fever" and determined to get her share of the "stuff." Acting upon this determination, she procured passage to Skagway for herself and boys. On arrival at Skagway she found herself without money. She secured a room for herself and boys and took employment as a cook, and in this capacity earned money enough to send for her household goods and horses that she had left behind. Upon the arrival of the horses she outfitted a four-horse team which she drove herself, and with which she did an express business between Skagway and White Pass City. She told me that in making one of her trips, she counted twenty-two hundred dead horses at Dead Horse Gulch. With her enormous earnings from her express business she started her hotel operations, which since has increased rapidly and made her probably the wealthiest person in Skagway.

In the execution of her arduous employment and duties, Mrs. Pullen did not neglect her boys. They

were sent to the school at Skagway and later to the University of Washington, at Seattle. The two oldest graduated with honor, but the third, while on his way to Seattle, lost his life by accidentally falling overboard at Ketchikan. In 1906, Major Richardson of the United States Alaska Road Commission, was boarding at the Pullen House and became much interested in the eldest of the Pullen boys, and recommended him to President Roosevelt, who appointed him as the first cadet from Alaska to West Point. Young Pullen graduated with honor and now ranks high as an engineer in the United States War Department. The second boy after graduation in the University of Washington took service with a large mining corporation of Alaska as a mining engineer.

I have mentioned P. E. Kern as a leading citizen of Skagway. He came there from Texas. Mount Dewey overlooks Skagway and its surrounding country and waters. The melting ice of the Mount Dewey Glacier is the source of supply of water for a large stream that flows down the side of the mountain. Fifteen hundred feet above Skagway the stream flows through a gorge from which it emerges in a beautiful cataract. Kern conceived the idea of erecting a lodge at the cataract for the convenience of tourists. To the accomplishment of this undertaking he preempted or homesteaded one hundred and sixty acres of the mountain side which included the cataract and stream from there down to Skagway, and this gave him control of the situation. He then constructed a chalet which overlooked the cataract; this became known as "Kern's Castle." Kern's health failed and he returned to Texas. Before leaving, he transferred his homestead and castle to Mrs. Pullen. I climbed to it with her in 1911, and from it

had a wonderfully beautiful outlook. After that a forest fire on the mountain side spread to and destroyed "Kern's Castle." However, the stream continues to furnish Skagway with an abundance of the purest water and the power to run the electric plant.

Skagway, the "Gateway to the Golden Interior," was founded by William Moore, its first white citizen, in 1897, when gold was first discovered at Dawson, Yukon Territory. The town has a population of about one thousand. It has been well laid out and its buildings are of a fairly good character—some of them very good, as for instance the headquarters of the Arctic Brotherhood. It has many beautiful and well-kept lawns and gardens. Quick growth flowers and vegetables are grown in the gardens in great profusion and perfection. I saw sweet peas that were so tall that the grower had to use a small step-ladder in gathering the flowers. This wonderful growth is due to the stimulation of the long days of sunlight and the moisture of the dew that accumulates at night.

Juneau and the Treadwell Mine

In a former chapter I followed the Whidbey party in their survey of Lynn Canal back to Favorite Channel, which they entered and extended their survey through Stephens Passage to the head of Gastineau Channel and from thence they returned into Lynn Canal; in this chapter I propose to review that survey.

Favorite Channel on the northeast and Saginaw Channel on the southwest side of Shelter Island connect Stephens Passage with Lynn Canal. Shelter Island is seven and three-quarters miles long, high and wooded. At its northwest end is a dome-shaped peak about twelve hundred feet high, which forms an excellent landmark when coming down Lynn Canal.

Stephens Passage is the continuation of Frederick Sound northward of Point High. It is part of the Inside Passage used by vessels going to Juneau and Skagway. At its northwestern end it is divided by a group of large islands into two channels, called Saginaw and Favorite channels which connect it with Lynn Canal. The waters in it are everywhere deep and generally free from dangers.

Gastineau Channel enters from Stephens Passage and runs from Point Tantallon to the flats of Juneau eight miles, gradually narrowing from one and one-eighth miles at the entrance to one half mile abreast of Juneau Islet. Juneau is practically the head of navigation in this channel, as the flat above makes out from both shores, with a narrow channel between, for two miles.

Above this and up to Entrance Point at the western end the channel is closed, only carrying about five feet of water at highest tides. Marmion Island is small and lies close to the southern point at the entrance. About five miles above this island is a small, grassy island one-half mile off the southern shore called Juneau Isle. Douglas is a post office and mining town on the south side of the channel at Juneau Isle. It is the headquarters of the Treadwell Mining Company. A steam ferry runs from this town to Juneau. The town and wharves are lighted with electric lights. There are two wharves for deep-draft vessels. Douglas wharf is about one fourth of a mile west and Treadwell Mill wharf one-fourth of a mile east of Juneau Isle. There are boat landings at both wharves.

Alice Henson Christoe, in her pamphlet, *Treadwell, an Alaskan Fulfillment*, says: "Twenty-eight years ago, 'French Pete' a prospector from Sitka, lured by tales told among the Indians of wonderful gold placers somewhere to the west of Taku Inlet, landed on the shores of the green wooded island indicated by natives of the party and began washing out the sands of a near by stream. The rich harvest of golden grain proved the tales to be no mere idle rumors. The prospector promptly staked out claims, hastened back to Sitka for more supplies, announced his strike, and soon the gold pans and rockers were working hastily. 'French Pete,' or Pierre Frussard, to use his proper name, after working over his claim, sold the two of them, little dreaming the full extent of their value, to a Californian named John Treadwell for about four hundred dollars. Treadwell prospected till he had located the ledge and began crushing the rock by means of a primitive contrivance called an arastra. Then realizing that capital

was necessary to develop the mine property he went to San Francisco and organized the forerunner of the great company which still bears his name. Surrounding properties were bought up and in 1882 the first stamp mill was erected.

"The group of mines known the world over as 'The famous Treadwell mines' is made up of four adjoining properties, owned by three distinct companies, but operated under one general management. Of these the original or 'Treadwell mine,' evolved from the historic 'Paris' lode which 'French Pete' sold for a song, is the largest. This one mine has produced gold enough to pay three times the purchase price of Alaska, to say nothing of the other mines of the group, which though not so long in operation, have steadily produced their share of gold. . . .

"To provide the necessary power for operating the mines, an immense ditch has been constructed at a cost of a half million of dollars; this after tapping a large lake in the interior of the island, winds along for twenty miles, picking up the small streams on the way. The copious rainfall and melting snows keep it well filled nearly the year round. In treating the rock, advantage is taken of every possible device for saving labor and expense. Gravity plays a prominent part in the transportation of the rock during the various stages of its treatment, doing away almost entirely with the more primitive loading and hauling by man or horse power, from the time the rock is blasted out in the stopes to the time it finds its way into the channel as 'tailing' as it is commonly called. Only once in the process is it elevated. This is when the broken rock from the various levels is drawn up the shaft by means of a skip to the crushers at the top of the shaft head-

gear. From here it falls into cars which draw it to the mills. It is crushed to a pulp by the heavy stamps, then run over copper plates to which the gold adheres. The pulp descends by means of launders to the concentrator floor, where it is run over vanners consisting of an inclined, slowly-revolving rubber belt with a continual side-shake movement. Small jets of water at the same time play upon the pulp. The heavier concentrate is washed off by the water into a trough at the higher end of the rowling belt, while the tailing or waste rock flows on and out into Gastineau Channel. . . . Of the average value — \$2.20 per ton — contained in the ore, about two dollars to the ton is recovered in the free gold and concentrate in a relative proportion of one-half the value from each." Such, in brief is the story of the Treadwell gold mines, as I saw them when I visited them on August 20, 1913.

Our boat was met at the landing by Mr. Monte Benson, the representative of the mining company, who conducted us through the stamp mills and other buildings of the company and kindly explained to us all of the process by which the gold bearing rock was reduced and the gold separated from it, but he in a very genteel manner declined to conduct us through the mines saying that the rules of the company would not permit him to do so. He did, however, conduct us to and showed us the "Old Glory Hole," which had been worked out in mining to a depth of four hundred and fifty feet. It made some of us dizzy to look down into its cavernous depth. Determined on going down into the mines. I went to the superintendent's office, introduced myself as a newspaper correspondent, presented credentials, and asked of him the privilege of being conducted through mines. He readily acceded to my

request and assigned me a guide. My movements had been watched by Mr. and Mrs. C. L. Nisley, Springfield, Ohio, Mr. R. W. Caughan, San Francisco, California, Mr. J. W. Conger, Cleveland, Ohio, and Honorable F. Medici Di Margrano, Consul for Italy in South Africa, who were fellow passengers, and they were permitted to join me. We were lowered into the mine sixteen hundred feet and then were conducted through it, and in doing this we reached a point two thousand feet out under Gastineau Channel. It was a novel and most interesting experience that we enjoyed. We found stretching away a bewildering network of stopes, drifts, and manways whose vastness the casual visitor usually fails to comprehend. When we offered to pay our guide for his services, to our surprise he declined to accept anything; saying that "tips" were not allowed, and he added, "The world is my country, every human being is my friend, to do good is my religion — this is the good friendship of the Alaskans."

We had been told in advance that when mooring at the Treadwell wharf we would see vast flocks of sea gulls. Our informant told us that at this time of the year all kinds, sizes, and ages of them gathered here for the coming of the winter. Sure enough as we came to anchor we were greeted by the gulls, as we had been told we would be. Concerning these, Alice Henson Christoe says: "For so many years has the tailing sifted down into the clear, green water that it has formed along the shore great, gray flats which are exposed to the receding tide, making a home for thousands of sea gulls, with here and there a wise old raven or an ebon colored crow. These gulls are as characteristic a feature of the bay at noisy Treadwell as are the doves of Venice, or the ibis of the sacred, storied Nile.

The law forbids their killing, so they hold safe and undisputed possession of their sandy flats, feeding on the quantities of waste food thrown out from the boarding houses. Meal time transforms them into a screaming, swooping mass whose shrill cries may be heard for yards around. Rarely indeed it is, day or night, that one may not hear that cry – their mournful note reminding one of the ‘gray galloway land’ of Stevenson’s – ‘where, about the graves of the martyrs, the whaups are crying.’ During quiet parts of the day they sit, long solemn lines of them, all facing in the same direction, toward the wind, like so many devout Moslems praying toward Mecca.”

In the preceding paragraph mention was made of the “great, gray flats” made by the “tailing sifted down” from the stamp-mills down “into the clear, green water,” of Gastineau Channel. When I was there, this had been done to such an extent that it threatened to impair the navigation of the channel. I was told that the governor of Alaska was considering the advisability of taking steps to enjoin the use of the channel as a place for the disposal of the tailing of the mines. In March, 1916, the bottom of Gastineau Channel broke through over the Treadwell mines and submerged them in water and thus utterly destroyed them. The disaster was due to the over weight of the tailings that had accumulated in the channel over the mines – a real instance of killing the goose that laid the golden egg.

Juneau is an important town on the north side of Gastineau Channel opposite the Treadwell mines, and eight miles from the entrance of the channel. From the harbor Mount Juneau has the appearance of rising directly out of the town – so sheer and bold is its up-



BIRDEYE VIEW OF JUNEAU, ALASKA, 1905

ward sweep to a height of three thousand feet. Juneau is principally interested in mining development, for which it is the base of supplies in this portion of Alaska. It has several wharves for vessels. The town and wharves are lighted with electric lights. Steamers, carrying passengers and freight, ply regularly from Seattle to southeast Alaska and westward and stopping at Juneau. There is local communication by steamer from Juneau to Skagway, Windham Bay, Sitka, and way ports. There is a relief station of the United States Public Health Service at Juneau; the nearest United States Marine Hospital is at Port Townsend. The United States military telegraph cable in charge of the Signal Corps of the United States Army, connects Juneau with the outside world. The United Wireless Telegraph Company has installed a working station at this point and has equipped all passenger steamships navigating these waters with wireless apparatus.

Major General A. W. Greeley, U.S.A., the famous soldier, explorer, and traveller, who knows Alaska as a whole and particularly the Panhandle or southwestern Alaska thoroughly, says of Juneau and vicinity in his *Handbook of Alaska*: "The oldest settlement in Alaska is Juneau, and it has the most evident signs of that permanency which casual visitors are fond of denying to Alaska towns. As the capital of the territory, the metropolis of southeastern Alaska, and the center of mining operations, Juneau was properly named for Joseph Juneau, whose discriminating eye and mining skill discovered the quartz and placer riches that have made the region famous." Juneau came from Sitka, "grubstaked," to this region in 1880.

On October 1, 1906, by executive order of the Pres-

ident of the United States, the capital of Alaska was transferred from Sitka to Juneau, and all of the government offices have been moved to this place. The city has a population of about twenty-five hundred. It is governed by a mayor, and six councilmen, with a city clerk, municipal magistrate, and city police. The residences, business houses, and streets are lighted by electricity. Two water systems supply the city with the finest and purest mountain water. The streets and walks are paved with plank and the city has a sewerage system. The residences are all substantial frame structures, though concrete is beginning to be used in the construction of business buildings and in foundations. Church edifices have been erected here by six denominations, and a graded and high school offer admirable educational facilities for the Juneau children. An orphanage and school are maintained by the Catholic Church.

Juneau lies about the center of a mineralized district known as the "Juneau Gold Belt," which extends from Windham Bay northward to the head of Lynn Canal, approximately one hundred and twenty miles in length and as wide as long. This district is described by Arthur C. Sponcer and Charles W. Wright, two eminent geologists, in *Bulletin No. 287* of the United States Geological Survey, printed in 1906, under the title of the "Juneau Gold Belt," in which it is said, "In whatever direction one travels from Juneau within this belt, quartz mines are to be found in every stage, from the prospect to the highly developed mines."

I have visited Juneau a number of times. The most satisfactory visit was made from September 21 to the 25, 1914. As stated in a previous chapter, it was discovered at Haines that the piston of our ship was so

badly out of condition that our vessel could not with safety proceed on the voyage to Cook Inlet. For this reason the captain of the vessel determined to return to Juneau and have a new piston made. The morning of the 22nd, I inquired of one who knew, how I could get a best view of the city and he answered, "Go up Gold Street to Eight Street, then across to Main Street and down it to the dock; by so doing you will get a fine view of the city and Gastineau Channel." I followed his directions and found that he was right. It occurred to me that an interesting tramp could be made up Gold Street and then along Gold Creek out into the mountain region where I could visit a gold mine that was being operated in that region. I made the tramp and I shall never forget it. When I had gone part of the way it commenced raining, and not having an umbrella, I got thoroughly drenched. While trudging along I overtook a young man who was going the same way to the mines to get a job, which he did not get. This, I think, was the most picturesque tramp that I have ever made. The banks of Gold Creek and the mountain side were covered with "devil's club," which at that time was at the height of its beauty, made so by its luxuriant, golden-colored foliage. Gold Creek I found was full of cataracts, the lure of which was most fascinating. I was told that a tunnel was being constructed from Perseverance to Sheep Creek, a distance of ten thousand feet, that three hundred men were employed on the work, and that the gold quartz taken from it would pay for its construction. The next day, September 23, I walked to the Salmon Creek Dam. I was accompanied by D. E. Leatherman, a pianist of Juneau, who formerly had resided at Seattle. We left Juneau at 8:40 A.M. and arrived at the mouth of the

creek at 9:50 A.M. I found the condition of Salmon Creek very different from that of Gold Creek. A narrow gauge railroad had been constructed from the power house at the mouth of the creek to the dam for the purpose of conveying material with which to construct the dam. This road followed the creek through a dense forest composed of large trees. Not so many water falls were in sight as in Gold Creek. We followed the railroad through the forest of hemlock and spruce to the second power house, where we were joined by Mr. Joe Whaler, chief cook, who accompanied us to the dam and told us much about the dam and its construction. From him we learned that the dam was one hundred and sixty-seven feet high, six hundred feet long, and twenty feet thick at the top. We reached the top by a series of two hundred and fifteen steps. But for the assistance of Mr. Whaler, I would not have been able to make the ascent to the top of the dam.

Thursday, September 24, was spent in visiting the various places of interest in the city, including the federal court house and territorial building, where I formed the acquaintance of the territorial governor and other officers; also the newspaper offices of the "Empire" and "Daily Despatch." I found the Auk Indian village down near the wharf, and a more squalid community I had never seen before. The inhabitants and their surroundings were fitting beyond description. The two-story frame residence of Chief Johnson was vacant and seemed to have been abandoned. These Indians probably are the descendants of those that gave Whidbey so much trouble when he was making his survey of Gastineau Channel.

In returning from the survey of Gastineau Channel, the Whidbey party entered and made a survey of Fun-

ter Bay. This bay is at the junction of Lynn Canal and Chatham Strait, ten miles southward of Point Retreat and five miles from Point Couverden. It is the most convenient anchorage in the vicinity. The bay is two miles long in a N.N.E. direction and three-quarters of a mile wide at the entrance and expands slightly inside. There is a small stamp-mill on the southeast side of the bay, and some mining development has been done there. A cannery and wharf are on the northwest side of the bay west of north from Ledge Island. Here is located the post office of Kunter. There are steamer communications from here with Juneau.

I first visited Funter Bay, July 29, 1911, in the steamer Cottage City en route for Sitka. Two days later the steamer returned to the cannery in the bay for a load of canned fish. It was then that I first witnessed the process of fish canning, which in its entirety was a filthy process. The manual labor was performed by Chinese and Indians. Each of these had temporary quarters on the beach, which was a beautiful one but which had been made disgusting with the offal and filth thrown upon it; the Chinese portion of the beach was the cleanest—the Indian portion being extremely filthy and disgusting. It was from these filthy quarters that the help at the cannery came and handled the fish that was going through the process of being canned. After witnessing this I promised myself never again to eat canned salmon. The process of canning since then has been changed and a machine called a “chink” supplants the filthy hands of the Chinese and Indians. Great care is now used to have the canneries kept in the most cleanly condition, and the handling of the fish is done in the most orderly and cleanly manner.

Sitka

Chatham Strait is the most extensive of the inland passages of southeast Alaska. It is eighteen miles wide at the entrance between Cape Ommancy and Coronation Island and fourteen miles between the cape and the west shore of Kuin Island, with a length of one hundred and thirty-eight miles from Coronation Island to Point Couverden. The body of the strait is a clear, open, and deep sheet of water, with some of its bays and bights foul.

Peril Strait, so named because of its dangers, is important as forming a frequently used inland passage connecting Chatham Strait with Salisbury Sound and the inland passages extending southward to Sitka. I have voyaged through it in going to and returning from Sitka. It has a total length of about thirty-eight miles.

Salisbury Sound has its entrance from the sea in latitude $57^{\circ} 22'$, longitude $135^{\circ} 34'$, and connects Peril and Neva straits with the Pacific Ocean between Cape Georgiana and Klokachof Island. It is about six and a half miles long in a general east by north direction, two miles wide at the eastern end, and four and a half miles where it joins the ocean. About one and three-quarters miles from the eastern end the channel is contracted to one mile by Yolo Islands, on the north side, and Sinitsin Island on the south. Vessels from Cross Sound, Yakutat Bay, and the coast westward bound for Sitka commonly enter through Salisbury Sound, as the

distance is less than by way of Cape Edgecombe and it puts them sooner into smooth water. The shores of the sound are foul, especially the north side, which is studded with islands, rocks, and reefs, with more or less kelp.

Sitka Sound has its entrance between Biorka Island and Cape Edgecombe. It extends in a northerly direction about fourteen miles, with a width east and west of seven to ten miles. The east and north shores are fringed with numerous islands and rocks and indented by bays and inlets. At its north end the sound connects with several bays and entrances extending northward, and with Olga Strait, which is part of a navigable inland passage connecting Sitka Sound through Neva and Peril straits with Chatham Strait. The shores are everywhere wooded, rendering it difficult to distinguish from a distance the wooded islets when they are on the land, which usually rises rapidly a short distance from the sea, culminating in broken mountains. Biorka Island, the southeast point at the entrance to Sitka Sound, is low, wooded, and has numerous rocky cliffs. Mount Edgecombe, an extinct volcano, is the prominent landmark for Sitka Sound. In Higginson's *Alaska, the Great Country* it is said: "It is only eight thousand feet in height;" however, as a matter of fact, it is only three thousand, four hundred and sixty-seven feet high. On a clear day as viewed from Sitka it is a pearl of beauty adorning the landscape. From any point seaward it is easily distinguished by its isolated position, its flat top, its peculiarly streaked appearance, and its reddish color. The upper part is a bare cone of a reddish-brick color. Extending down the sides of the cone are numerous deep gullies or ravines, in which the snow lies until

late in the summer, giving it a peculiarly streaked appearance. The crater is from three to four hundred feet deep. It is the seat of Indian myth and legend. It is claimed that the old woman who supports the world on her shoulders went down into this volcano to the underworld; also, that Techak, the great eagle, caught whales in the ocean and carried them to the top of this mountain.

The eastern side of Sitka Sound has many deep indentations, with numerous outlying islands, rocks, and reefs. Between these are deep channels which, by reason of their tortuous courses and detached rocks, are unfit for navigation by any but the smallest vessels. Hot Springs, one of these, is much obstructed by islets and rocks. The hot springs have a temperature of 122° fahrenheit, and the water contains sulphur, chlorine, iron, and magnesia. There are no permanent residents here but somewhat rude accommodations are afforded by a few buildings erected by private parties. Sir George Simpson in his *Journey Around the World* in 1840-41, says: "While at Sitka, I took a bath, which might be a very good thing to those that like it. On entering the building, I was much oppressed by the steam and heat, while an ill-looking, long-legged, stark-naked fellow was waiting to officiate as master of ceremonies. Having undressed in an ante-chamber, so far as decency would permit, I made my way into the bath-room, which was heated almost to suffocation. Having thus got me into his power, the giant attendant threw some water on the iron furnace, while, to avoid, as far as possible, the clouds of steam that were thus raised, I squatted myself down on the floor perspiring profusely at every pore. I next seated myself on a bench, while bucket after bucket of hot water was

thrown on my head; and then, making me stretch myself out, my tormentor soaped me all over from head to foot, rubbing and lathering me with a handful of pine tops. Once more taking his bucket, the horrid operator kept drenching me, the successive pailfuls descending gradually from nearly a boiling heat to the temperature of fifty degrees. The whole process employed about an hour. I then returned to the ante-chamber where after being dried with hot towels, I was very glad to put on my clothes. It was impossible, however, to make my escape immediately, for I was so relaxed as to be obliged to recline on a sofa for a quarter of an hour; and then I withdrew, inwardly resolved never again to undergo such another castigation."

Old Sitka Harbor is a bight which opens westward on the east side of Sitka Sound, one and a half miles north of Old Sitka Rocks, and just south of the entrance to Katlian Bay. There some Indian shacks on the point dividing the two coves on the east side of the harbor. The anchorage is abreast of the south cove, about four hundred yards from the shore, in eighteen to twenty fathoms of water with soft bottom.

In 1799, Alexander Baranof was placed in charge of the operations of the Russian-American Company in the colonies. In consequence of good reports received from two exploration parties sent out by him, he visited Old Sitka in the Olga, with a large fleet of Aleutians in their kyaks from Kodiak. One hundred and fifty of them died from eating poisonous mussels. Baranof made one of the natives of the bay a chief, under the name of Medrednikof, and set about the construction of a fortified factory, which he called Fort Archangel Gabriel. The fortified factory was com-

pleted in the following spring, and Baranof took formal possession of the territory in the name of Russia. He then returned to Kodiak. In May, 1802, the assembled Thlingets of Sitka, under the chiefs who had been appointed by the Russians, attacked Fort Archangel Gabriel and drove out the inmates. All of the officers and thirty men were killed. Two days after the attack the English Captain Barber arrived, and saved eighteen women, two Russians, and two Aleutians, who were being hunted by the savages in the woods.

Sitka, "the City of a Hundred Green Isles," is on the northern side of Sitka Sound. There are three channels which lead to Sitka Harbor among the islands and reefs on the north side of Sitka Sound.

Sitka is fronted with a most beautiful gravel beach; in the rear, overlooking the town, is Mount Verstovia, perpetually capped with snow and ice; and between the beach and mountain is Indian River, fed by melting snow and ice of the mountains. This is the most beautiful mountain stream that I have ever seen. More than a hundred little islands lie in the harbor of Sitka. "Each one is a tangled bit of rock and forest, and bordered with mats of golden and russet sea-weeds, that at low tide add the last tone to a landscape of the richest coloring. Every foot of island shore off Sitka is sketchable and a picture of itself." An additional attraction to Sitka is a promenade, a well-gravelled walk that the Russians built along the curving line of the beach and through the woods, to the banks of Indian River. Lieutenant Gilman, in 1884, cleared a new pathway, from the beach to the river. He led paths up either side of the stream for a half mile or more, bridged the stream

twice, and threw two picturesque bridges across the streams on the river bank. All along the river the ferns run riot curling their great fronds up with the huge, green leaves of the "devil's club." The mountain side and valley are densely wooded with giant firs and pines.

Captain Urey Lisiansky, commander of the *Neva*, arrived in Kodiak, July 13, 1804, and found that Baranof had sailed for Sitka in the spring with four small vessels, one hundred and twenty Russians, and about eight hundred Aleutians in their kyaks, for the purpose of attacking the Thlingets, who had fortified themselves on a rock near the settlement at Old Sitka and now defied the Russians. He, therefore, determined to sail to Baranof's assistance. He left St. Paul, August 15, and arrived in Norfolk Sound on the 20th. Baranof had arrived the preceding day. On October 1, the *Neva* fired upon the fort, and no reply being received, Baranof and a party of Russians and Aleutians attempted to storm it. They were repulsed with some loss by the natives, who sallied out and drove them to their boats. Baranof was wounded in the arm. The next day the *Neva* opened fire on the fort with heavy guns, and, on October 3, the natives hoisted a white flag. The fort was not surrendered, however, but was evacuated by the natives on the night of the 6th. They are said by Lisiansky to have killed a number of infants and dogs, lest by making a noise, they should give the alarm. The garrison was estimated to have numbered about eight hundred. The walls of the fort were so thick that the shot from the *Neva* did not penetrate them. It was defended by two cannon and was evidently evacuated before the occupants were out of ammunition. The Russians had ten or twelve

killed or wounded. On October 8, the fort was burned by order of Baranof. Then was laid the foundation of the new fort, which was called Fort Archangel Michael. The settlement, now known as Sitka, received the name of New Archangel.

Immense houses were built solidly and with every consideration for comfort and safety, and many families lived in each. They ranged in size from one hundred to one hundred and fifty feet in length, and about eighty feet in width, and were from one to three stories high with an immense attic. They were well finished with polished floors and richly papered walls. The barracks, the custom house and the governor's castle formed a group of buildings on the right of the landing wharf, and the small battery at the foot of the castle terrace was quite imposing. The castle was a heavy, plain, square log building, crowning a rocky headland that rose precipitously from the water on three sides, and turned a bold embankment to the town on the other. According to Captain Meade, this eminence was called Katalan's Rock by the early Russian settlers, in memory of the chief who lived on it, and the governors made it a perfect fortress, with batteries and border defenses and sentries at all of the approaches to it.

Alexander Baranof was a man of iron energy, and coarse, licentious, shrewd, and of enterprising habits. Washington Irving in *Astoria* gives an account of the voyage of the Beaver from Astoria to New Archangel, which was consummated on August 19, 1912. He says, in speaking of New Archangel: "The place at that time was the residence of Count Baranof, the governor of the different colonies, a rough, rugged, hospitable, hard-drinking, old Russian; somewhat of a soldier,

somewhat of a trader, above all a boon companion of the old roystering school, with a strong cross of the bear." Mr. Hunt, who was in command of the *Beaver*, found this hyperborean ensconced in a fort which crested the whole of a high, rocky promontory. It mounted one hundred guns, large and small, and was impregnable to Indian attack, unaided by artillery. Here the old governor lorded it over sixty Russians, who formed the corps of the trading establishment, besides an indefinite number of Indian hunters of the Kodiak tribe, who were continually coming and going, or lounging and loitering about the fort like so many hounds round a sportsman's hunting quarters. Though a loose liver among his guests, the governor was a strict disciplinarian among his men, keeping them in perfect subjection. Besides these immediate serfs and dependents just mentioned, the old Russian potentate exerted a considerable sway over a numerous and irregular class of maritime traders, who looked to him for aid and munitions, and through whom he may be said to have in some degree, extended his power along the whole northwest coast. Baranof also erected at Sitka a foundry and sawmill. He made many superior bells and other castings which were shipped to the churches along the coast of southern California.

At the end of the main street of Sitka, fronting on a small square or court, stands the Russian Orthodox Cathedral of the Archangel Michael of Sitka. It was erected by the Russian-American Company, and the foundation for it was laid November 20, 1848. It has the shape of a cross, and is surmounted by a green roof, bulging spire, face clock, and a chime of bells that might distinguish any shrine in Moscow. It has three sanctuaries and as many altars. The chief and largest

sanctuary is that in the middle; it was dedicated in the name of the Archi-Strategos Michael. In the middle of the church there is an elevated platform; that is the Episcopal Cathedral. The sanctuary is separated from the body of the church by a partition or screen which is called the Ikonostas. This screen is adorned with twelve ikons or images in costly, silver castings, in artistically chased work. The middle door, leading into the sanctuary and called by the name of Royal Gates, is remarkable for its ornamentation in complicated carved work. The name Royal Gates is given to this door because through it the Holy Sacrament, the Eucharist, is brought out to the faithful, the body and the blood of the King of Heaven. Above this door is a sumptuous ikon representing the Last Supper, in a massive silver casting of much value and great artistic worth.

The Church of the Annunciation was built earlier than the Cathedral in 1843. The windows of the church command a magnificent view of the sea, the Sitka Archipelago, and the majestic circle of snow-clad mountains. At early morning services, worshippers can look on the radiance of a semi-polar sunrise. In front of the main façade of the Church, two mighty cedars lift their majestic heads, ever whispering their mysterious whispers to each other. They were planted by Bishop Innocentius. There is in this church a magnificent ikon of the Last Supper, of considerable value, donated by Innocentius, besides several others of much merit, both in color and in the beauty of the dreaming, the work of some of the best masters of the art.

Many years ago there was in the city of New York a body of people, organized for the purpose of placing orphans and waifs in homes in the west. Through

this instrumentality a waif was placed in the Christian home of a Mr. Brady of Kokomo, Indiana, who adopted him by the name of John G. Brady. The boy was given a good education, became converted, and was sent to Sitka as a missionary by the Presbyterian Board of Home Missions. He afterwards became governor of the territory of Alaska. For more than thirty years he resided at Sitka, where he was known as the "Rose Governor" because of his genuine admiration of this flower. His first United States appointment was that of United States Commissioner at Sitka, and he arrived there and entered upon the duties of his office in September, 1884.

The Sitka Industrial Training School was established by Ex-Governor Brady. His plan for the conduct of the school was different from that of Father Duncan at Metlakatla. Father Duncan's theory was that his Indians should be kept apart from the whites and taught in their own language. To this accomplishment, Duncan devised a written Tsimpsian language. Ex-Governor Brady's thought was to have his Indians brought directly in contact with the whites and have them taught to speak and write the English language.

The school passed through various discouraging vicissitudes until Dr. Sheldon Jackson, Mr. Austin, and Mr. Brady induced the Board of Home Missions of the Presbyterian Church, to whom the property of the school has always belonged, to aid in the erection of buildings for the use of the school. In the first place a building was erected for a Boy's Home, and a year later another for a Girl's Home. When I was there in 1913, I noticed that there were eight buildings, including the pastor's residence, the Jackson Museum, and the church. The last two were old; the others,

fully equipped, were built in 1911. Indian girls are taught "to cook, wash, iron, sew, mend, and to become cleanly, cheerful, honest, honorable women." The boys are taught "the trades of shoemaking, coopering, boatbuilding, carpentry, engineering, rope-making, and all kinds of agriculture work. The rudiments of brick-laying, painting, and paper-hanging are also taught."

The Indian mission at Sitka was founded and named for the Reverend Sheldon Jackson, who had charge of the Presbyterian Missions in Alaska, and the mission was placed under the care of Mr. and Mrs. Austin. The mission school was first attended by about one hundred natives, ranging from very young to the very old. For many years it was customary to keep the pupils at the school from the time of their admission until their education was completed. This course was pursued so as to avoid subjecting the pupils to the influence of their parents, who were but slightly removed from savagery. Now that custom is changed, and the pupils are granted a vacation and are permitted to return to their homes, where it is hoped that the influence of the pupils over their parents will be for good. The school now has an attendance of about two hundred pupils.

Perhaps the most interesting place at Sitka for a visit by the tourist and student is the museum established by the Reverend Sheldon Jackson for the purpose of preserving the anthropological, ethnological, and primitive history of the habits of the Indians of Alaska. In it may be seen two old totem poles concerning which Abby J. Woodman tells this interesting story:

"May 5, 1888, there was delivered at Sitka by the steamer Elder, for the Jackson Museum, two very old

totem poles which were covered with a green mould and showing evidence of great age. Notwithstanding this, their grotesque carvings were well defined and legibly told the story of brave chieftains who bore the proud titles of 'The Crow,' 'The Bear,' 'The Whale,' etc. They were taken to the museum of ancient relics at Sitka by Dr. Sheldon Jackson for preservation. They had been secured at Fort Tongass. On the same steamer he had brought with him thirty-seven bright Indian boys from a settlement near Tongass who had been under the patronage of Father Duncan, the Metlakatlah missionary. These boys were to enter the mission school at Sitka. When the totem poles were landed there was no means of conveying them to the museum. Doctor Jackson arranged to load them upon some old wheels to which was attached a long rope, and calling upon his mission boys to join the Metlakatlahs, numbering in all one hundred and seven he ordered them to form a procession on the rope, and the boy's band to strike up its music. The boys entered into the spirit of the occasion with a will, and the old totem poles made a sort of triumphal entrance into Sitka, and were taken to the museum and placed in position, where they will probably long remain a spectacle for the curious and a memorial of the ancient customs of the native Alaskans."

Sheldon Jackson was no doubt the most useful citizen who ever resided in Alaska. He was not only a great and good missionary, but also Alaska's greatest benefactor, for it was he who induced the United States to introduce into northern Alaska a small herd of reindeer. A small herd has so rapidly increased that now there are hundreds of thousands of them. Their great usefulness cannot be questioned. They not only prom-

ise an abundant local supply of milk, meat, and hides but will also, in the near future, furnish much of these articles for export.

Fronting the beautiful beach at Sitka is the Episcopal Cathedral "St. Peters-by-the-Sea." The church is free, and any one may enter it.

Its doors stand open to the sea,
The wind goes thro' at will,
And bears the scent of brine and blue
To the far emerald hill.

I first entered the cathedral, Sunday, July 30, 1911, and bowed in prayer with the communicants. This was but a casual visit. My next visit was Monday, August 18, 1913, not for prayer, but to make a study of the cathedral and accessories. I was met at the door by a gentleman who had charge of the cathedral and the residence of the bishop; the bishop at that time was not at home, but was making a missionary tour in the interior of Alaska. Of him Mrs. Higginson says: "It was in 1895 that Reverend P. T. Rowe, Rector of St. James' Church, Saulte Sainte Marie, was confirmed as Bishop of Alaska. He went at once to that far and unknown land; and of him and his work there are no words ever heard save those of love and praise. He is bishop, rector, and travelling missionary; he is doctor, apothecary, and nurse; he is the hope and comfort of the dying and the pall-bearer of the dead. He travels many hundreds of miles every year, by lone and perilous ways, over the ice and snow, with only an Indian guide and a team of huskies, to carry the word of God into dark places. He is equally at ease in the barabara and in the palace-like homes of the rich when he visits the large cities of the world."

From the foregoing facts it must be concluded that Sitka has been and is the great missionary center of Alaska and that through the efforts of the missionaries hordes of savages have been converted to a fair state of Christian civilization. The carping critic may say, however, that the coming in contact of the Indians with the white man has caused a great decimation of the various tribes of Indians. This may be conceded as true, but it does not argue that the savages should have been left in a state of savagery – it rather argues the shameful disgrace and diseased condition of the white man, due to his lascivious habits. But for this continued condition, how much more effective would have been the work of the missionaries.

In *Alaska, the Sitka Archipelago*, E. Ruhamak Scidmore says that during the time the Russians kept their careful meteorological records at the Japonski Observatory and on shore, the thermometer went below zero only four times, and the variation between the summer and winter temperature is no greater than on the California coast. It is the warm current of the Kuro Sivo or Black Stream of Japan, pouring full on the shore, that modifies the temperature, and brings the fogs and mists that perpetually wreath the mountains, so that Fort Wrangell, though south of Sitka, is colder in winter and warmer in summer on account of its distance from the ocean current. The Sitka summer temperature of 51° and 55° pleases the fancy of dwellers in the east, quite as much as the even and temperate chill of 31° and 38° in midwinter. Ice seldom forms of any thickness, and skating on the lake back of the church in Sitka is a rarity. Whilst St. John's in Newfoundland is beleaguered by icebergs in summer, and its harbor frozen solid in winter, Sitka, ten leagues north

of it, has always an open roadstead. "The only drawback to this cool and equable climate is the heavy rainfall, which even a Scotchman says makes it a 'wee hair too wet.'"

The United States American barracks and the old Russian cemetery are located to the left of Main Street as one passes from the wharf to the Greek Cathedral, and the Indian village is between these and the harbor. During the Russian administration the Indians were confined in this locality in a stockade the gate to which was locked at night; now they have perfect liberty to go and come as they please. The houses of the village front the harbor and are of frame construction; there is much sameness in their architecture and construction. Some of the houses are marked; among the inscriptions, I noted the following: "Tlan-Tech of the Koke-wan-Ton-Clan;" "Anna Hootz Head Chief of the Sitka Tribe;" "Harvy Dick Bear Klan" (in front of this house was a bear); an eagle was painted on the front of another house, and on another, "Jacob Austin drowned in the sea May 14, 1911, aged 15 years." It was on Sunday that I made these notations and I was pleased to notice that the Indians were well-dressed and quietly observing the day. Charles Bennett, one of them, explained to me the painting on the large canoe, of which mention has heretofore been made, and which rests on the shore; he said that it means, "A whale killer kills a seal."

The United States Army barracks consist of a number of two-story frame buildings fronting the harbor and these seemed to be unoccupied when I was in Sitka. I visited the old Russian cemetery, and found it overgrown with rank bushes, ferns, and grasses. Here the Russians had buried their dead, and had

marked the graves with elaborate tombstones, which now are difficult to find and when found are moss-covered, making it almost impossible to tell how they were inscribed. An old blockhouse, which commanded an angle of the stockade, stands sentry over the graves. "Beyond the Russian cemetery, on the overgrown hillside, are the tombs of the chiefs and medicine men of the Sitka Klan. The grotesque images and queer, little burial boxes are nearly hidden in the tangle of bushes and vines, and their sides are covered with moss."

I was not able to trace the old ship yard. It has been said that it was a most complete establishment in its day. For a long time it was the only yard on the coast, and vessels of all nationalities put in there for repairs. Nor was any trace of the old foundry to be found. At the foundry the Russians made ploughs and exported them to the Mexican possessions south of them, and the bells of half the California mission churches were cast at this foundry. Power for the old sawmill was supplied by an overhead flume and water wheel, which is still to be seen on the east side of the mill. The old mill has been replaced by one which is operated by electric power.

On August 18, 1913, I sat upon a much marked rock alongside the pathway in front of the Presbyterian mission and made entries in my note book as to what I had learned about the mission. I then did not know that there was any peculiar significance attaching to the rock upon which I sat. I afterwards learned that it was known as the "blarney stone" also, as the "Baranof Rock." Concerning this rock Miss Scidmore says: "Where the path again reaches the beach and brings in view the harbor and its islands, a large square block

of stone lies beside the path. It is popularly known as the Blarney Stone, and dowers the one who kisses it with a charmed tongue. All the men-of-war and revenue cutters that have visited the harbor have left their names and dates cut in the rock and some strange old Russian hieroglyphics antedate them all and give a touch of mystery to it. Captain Meade speaks of this Blarney Stone as a favorite rock 'on which Baranof, the first governor, used to sit on fine afternoons and drink brandy, until he became so much overcome that his friends had to take him home.' "

The Explorers Complete Their Work

In the afternoon of July 28, 1794, Vancouver left Port Althorp, so named by him. This port has its entrance on the eastern side of Cross Sound, seven miles northeast of Cape Spencer. Working their way slowly southward, exploring the coast as they went, the vessels, on the morning of August 1, anchored in a cove (Port Conclusion) some miles south of Cape Ommancy. The same morning, Vancouver, accompanied by Mr. Whidbey and Mr. Johnstone, rowed to the entrance of the cove in order to be better able to arrange the mode of conducting expeditions to be made by Mr. Whidbey and Johnstone separately, by which means Vancouver entertained the hope of being able to connect the surveys of the present with those of the two preceding seasons. This appeared to be no difficult task, as there were two given points before them, both of which were nearly in view. The one was Cape Decision, where their examination of the continental shore had finished the former season, and the other was Point Gardner, whence Mr. Whidbey had returned on his last excursion from Cross Sound. Mr. Whidbey was directed to recommence his researches from that point, whilst Mr. Johnstone proceeded to Cape Decision, there to begin his examination along the eastern shore of the sound northward until the two parties should meet or be otherwise informed by notes which each party was to leave in conspicuous places for the

government of the other, describing the extent of their respective surveys.

On August 19, the four boats returned to Port Conclusion with the glad tidings of having performed the service assigned to them. The Whidbey party had visited Point Gardner, Frederick Sound, Point Gambier, Seymour Canal, Stephens Passage, and on August 8, reached Point Arden, where Stephens Passage divided into three arms; that which appeared to be a continuation of (Stephens Passage) the arm they had been navigating took a northeasterly direction; the second (Taku Inlet) took a northwesterly direction; the third and widest arm (Gastineau Channel) took a general course N. 81° W.

I have visited Taku Inlet many times. Farr and Martin say: "This beautiful fiord just south of Juneau, is visited annually by thousands of transients, and the Taku Glacier has become one of the best known in Alaska, especially during the past fifteen years when Muir Glacier has been less accessible, and has lost beauty through retreat and loss of height. Within the fiord are also the Norris, Wright, and Taku glaciers, besides a few smaller glaciers up the Taku River, but the Taku Glacier is the only one discharging icebergs. . . . Taku Glacier, for which the names Schultze Glacier and Foster Glacier were temporarily used, is thirty miles long, heading to the north on a five thousand five hundred foot snow divide as a through glacier, the other end of which flows down the east side of the Canadian coast range."

On an islet in Gastineau Channel Whidbey found an Indian village, and another was seen on an opposite point lying north, about a league and a half from this cove, on the land forming the north side of the arm,

and to the northwest point of what is now known as Douglas Island. As Mr. Whidbey advanced from this cove, he recognized the spot. From it in his excursion from Cross Sound, on the night of July 18, he had retired, in consequence of the hostile behavior of the natives, and he now became satisfied that he had been mistaken in supposing at that time the branch to be closed. It was now evident that it communicated with that which the party had thus navigated, making the intermediate land, which had hitherto been considered as a part of the continent, one extensive island, which Vancouver called Admiralty Island.

In order that no doubt should arise in the future that the intermediate land which had hitherto been considered a part of the continent was in fact an extensive island, Mr. Whidbey determined to proceed to Point Retreat and make a re-survey. In doing this, after passing the Indian village, which from that point was at the distance of about ten miles, the boats were followed by many large and small canoes; and as the evening was drawing near, to get rid of such troublesome visitors, a musket was fired over their heads, but this, as before, had only the effect of making them less ceremonious. This was proved by their exertions in paddling to come up with the Whidbey party, which they did very fast, until another shot was fired at the largest canoe, and this was supposed to have struck her, as the Indians all fell back in the canoe and were quite out of sight. They, however, managed to bring their canoe sterns in a line with the boat sterns; in that situation they paddled backwards with all their strength, and at the same time screened every part of their persons, by the height and spreading of their canoe bows, excepting their hands, which in the act

of paddling only became visible, so very judiciously did they provide for their safety. Having gained some distance from the Whidbey party, the canoes stopped for a short time, but soon made the best of their way back to the village, and Mr. Whidbey proceeded without further interruption to Point Retreat.

The shores of Admiralty Island, which now had been completely circumnavigated and found to be about sixty leagues in circumference, were, except at this and its southeastern part, very bold and afforded many convenient bays, likely of safe anchorage, with streams of water flowing into them and presented an aspect very different from that of the adjacent continent, as the island in general was moderately elevated, and produced an uninterrupted forest of very fine timber trees, chiefly of the pine tribe. The shores of the continent, on the other hand, were bounded by a continuation of the lofty frozen mountains which extended from Mount Fairweather, rose abruptly from the water-side, and were covered with perpetual snow, whilst their sides were broken into deep ravines or valleys, filled with immense mountains of ice.

Late the next evening they again passed the southernmost Indian village; and, after they had proceeded about three miles to the eastward of it, they rested for the night. Although the Whidbey party had been a considerable time within sight of the village of these unfriendly people, not a single individual had been seen; but they were heard making a most hideous and extraordinary noise in their houses, the sound of which reached the resting place of the Whidbey party, by whom it was supposed, that some person of consequence had been hurt by the shot the preceding evening.

In the morning of August 10, they were visited by

an old Indian man and boy, who after receiving some presents went about their business, and the Whidbey party proceeded to (Taku Inlet) the arm leading to the northeast from Stephens Passage, in which the great quantity of floating ice with a strong northerly wind against them so retarded their progress, that a passage was with great difficulty effected; the weather was severely cold, with frequent showers of sleet and rain. From its entrance it extended N. 11 E. about thirteen miles, where the shores spread to the east and west, and formed a basin about a league broad, and two leagues across. From the shores of this basin a compact body of ice extended some distance nearly all round; and the adjacent region was composed of a close-connected continuation of the lofty range of frozen mountains, whose sides almost perpendicular, were formed entirely of rock, excepting close to the water-side, where a few scattered, dwarf pine trees found sufficient soil to vegetate in; about these, the mountains were wrapped in perpetual frost and snow. From the rugged gullies in their sides were projected immense bodies of ice that reached perpendicularly to the surface of the water in the basin, which admitted of no landing place for the boats, but exhibited as dreary and inhospitable an aspect as the imagination could possibly suggest. The rise and fall of the tide was upwards of eighteen feet.

The examination of Taku Inlet engaged the attention of the Whidbey party until near noon of August 11, when they returned along the eastern shore, which was a continuation of the same range of lofty mountains rising abruptly from the water side. Surveying Stephens Passage as they went, they visited Holkam Bay and other places. Holkam Bay divides into two ex-

tensive arms. Tracy Arm, the northern one, takes a general N.N.W. direction for nine miles, then turns to E.N.E. $\frac{1}{4}$ E. thirteen miles to its head, where there are two large glaciers, called the Sawyer Glaciers, extending to the water's edge. This arm is somewhat difficult of access on account of the swirls and floating ice. Endicott, the southern arm of Holkam Bay, is twenty-five miles long in an E. by S. direction, with a width of three miles to Sumdum Island and narrowing to less than one mile at its head. At the head of this arm are the Dawes Glaciers extending to the water's edge. Sanford Cove is on the southern shore of Endicott Arm five miles within the entrance. Sumdum is a post office on the southeast side of this cove. Some mining has been done here. Ice is discharged by glaciers in both Tracy and Endicott arms, and is always present in Holkam Bay, sometimes in large quantities, and is prevalent in Stephens Passage off the entrance to the bay in greater or less quantities. This ice is dangerous at night or in thick weather.

As the Whidbey party advanced in Frederick Sound several islets were seen in various directions, and from Point Windham, on the eastern side were some bays, one of which was Windham Bay. This bay and its approaches are clear. Glacial ice in small quantities is generally present in Frederick Sound, coming from Le Comte Bay, where at times there are enormous quantities. It generally follows the south shore as far as the entrance to Thomas Bay. It may be expected as far as Sakof Islands. It is sometimes seen at Cape of the Strait, and a piece has been seen at Turnabout Island. Occasionally a few stray pieces work into Wrangell Strait as far as Green Point.

On August 16, the Whidbey party came to a place on

Frederick Sound where the mountains extended to the water's edge and part of them presented an uncommonly awful appearance, rising with an inclination towards the water to a vast height, loaded with an immense quantity of ice and snow, and overhanging their bases, which seemed to be insufficient to bear the ponderous fabric it sustained.

Soon after they passed Point Vandeput, a very remarkable promontory, the arm (Dry Strait) over which it hung appeared to be entirely closed by a beach extending all around the head of it; at the southeast extremity was a large body of ice, formed in a gulley between the mountains that approached the water-side, whence much broken ice seemed to have fallen and had entirely covered the surface of the water in that direction. From the southwest corner issued a narrow stream of very white water, that seemed to have obtained this appearance by the melting snow draining through the low land that was seen lying in that direction; and it was considered not to be navigable. Mr. Whidbey determined to lose no time in the further extension of his researches, but to return to the vessels which were distant upwards of a hundred miles. He accordingly made the best of his way back, along the southern shore of Frederick Sound. Vancouver afterwards was informed by Mr. Brown of the Jackall, that the narrow strait, the further examination of which had been abandoned by Mr. Whidbey, was found, on his subsequent visit to the place to afford a passage for canoes and boats, and that it communicated with an apparently shoal inlet that Mr. Johnstone had made several unsuccessful attempts to enter, August 28, 1793. Mr. Brown also stated that the intervening land which had the appearance of forming the head of the arm

between its southeast and southwest extremities was an island, situated on a very shallow bank, which at the depth of a few feet connected the two shores, and at low water during spring tides became dry. By this information it likewise appeared, that their conclusions at the end of the season of 1793 respecting Cape Decision being a continental promontory were not perfectly correct, as, by the shallow boat passage (Dry Strait) discovered by Mr. Brown, that cape was found to be separated at high water mark from the continent.

August 16, the day when Mr. Whidbey determined to return to the vessels, being fair, he embraced the opportunity of drying their wet clothes, putting their arms in order, and giving a thorough cleaning to the boats. Whilst doing this their attention was suddenly and most agreeably called to the fact that the boats under Mr. Johnstone were coming in sight.

In the event of the two parties meeting and consequently a finishing stroke being put to the examination of the shores of northwest America, within the limits of Vancouver's commission, Mr. Whidbey had his instruction to take possession of the said continent, from New Georgia northward to Cape Spencer, as also of all the adjacent islands they had discovered within those limits, in the name of, and for, His Britannic Majesty, his heirs, and successors. This, on the parties stopping to dine on August 17, was carried into execution. The colors were displayed, the boats' crews were drawn up under arms, and possession was taken under the discharge of three volleys of musketry, with all the formalities usual on such occasions, double allowance of grog being served to the respective crews for the purpose of drinking His Majesty's health. The happy meeting of the two parties, having taken place

on the birthday of His Royal Highness Frederick Duke of York, the sound in which they met, Vancouver honored with the name of Prince Frederick's Sound, and the adjacent continent, northwestward from New Cornwall to Cross Sound, with that of New Norfolk.

The Johnstone party had completed their survey without making any remarkable discoveries. On Hamilton Bay they saw the remains of no less than eight deserted villages; some of them were more decayed than the others, but they were all uniformly situated on some precipice, or steep, insular rock, rendered by nature almost inaccessible, and by art and great labor made a strong defence, which proved that the inhabitants had been subject to the incursions of hostile visitors. These fortified places were well-constructed with a strong platform of wood, laid on the most elevated part of the rock and projecting so far from its sides as to overspread the declivity. The edge of the platform was surrounded by a barricade raised by logs of wood placed on each other. In the vicinity of these ruins were many sepulchres or tombs in which dead bodies were deposited.

Having satisfied their curiosity and having gained the head of Hamilton Bay, the Johnstone party stopped to dine in a cove a little way from its termination. Hitherto they had not seen any of the natives, but at this time they were visited by several who came chiefly from the head of the arm, where they must have been secreted, among whom was a chief and several Indians who had been seen the preceding Thursday and Sunday. Whatever the real intentions of these strangers, their numbers and general appearance inclined Mr. Johnstone to desire them to keep at a distance; this the Indians did not seem inclined to do, although every

sign to that effect was made, so the Johnstone party armed for their defence. As the number of the Indians increased, they were encouraged to advance; on some muskets being fired they stopped for a short time, but soon again followed the boats as they returned down the arm, keeping just without the range of musketry. Although these people had among them some guns, and were otherwise well-armed with native weapons, Mr. Johnstone did not impute to them any hostile intention, but attributed the ardor with which they had striven to join his party to a desire of bartering their sea otter skins, of which they appeared to have many, for European commodities. But the situation of the Johnstone party was in a very confined place and being surrounded by so many armed Indians, with reason to apprehend there might be others at no great distance, it became prudent to avoid, if possible, a nearer intercourse. They must have been greatly interested, as they continued to follow the boats until after they had gained a more open situation. One of the canoes now advanced before the rest and a chief stood up, plucking the white feathers from the rump of an eagle and blowing them into the air, accompanied by songs and other expressions, which were received as tokens of peace and friendliness. The canoe was permitted to come alongside Mr. Johnstone's boat, and the chief instantly presented a sea otter skin for which Mr. Johnstone made him a suitable return. Expressions of mutual friendship were exchanged, and on it being signified to the chief that as night was approaching the canoes should no longer follow the boats, he returned to the rest of his countrymen; but they still continued to paddle after the party until a musket on two had been discharged, when they all dropped astern and

were no more seen. Mr. Johnstone deemed it wise to proceed as far as he conveniently could before he stopped for the night; and as the shore was quite steep and compact, they continued to row until midnight, when they came to a grapnel and rested in the boats.

Early in the morning of August 17, both the Whidbey and Johnstone parties set out on their return to Port Conclusion. In the course of the previous evening no small portion of facetious mirth passed among the seamen, in consequence of having sailed from old England on the first of April, for the purpose of discovering a northwest passage, by following up the discoveries of De Fuca, De Fonte, and a numerous train of hypothetical navigators. The boats made the best of their way toward the vessels, without any particular occurrence, until they arrived at Port Conclusion, August 19, when the wind blowing very hard from the southward brought with it a heavy sea, which, with the meeting of the tides produced a kind of race. Here the boats, for some time, were in a most critical situation; but by the great exertions of their crews they were at length preserved and soon reached the vessels, all well, and communicated the glad tidings of their having effectually performed the service and attained the object that had been expected from this expedition.

In this connection Vancouver says: "In order that the valuable crews of both vessels, on whom great hardships and manual labour had fallen, and who had uniformly encountered their difficulties with unremitting exertion, cheerfulness and obedience, might celebrate the day, that had thus terminated their labours in these regions; they were served with such an additional allowance of grog as was fully sufficient to answer every purpose of festivity on the occasion. This

soon prompted a desire for mutual congratulations between the two vessels, expressed by three exultant cheers from each; and it may be easily conceived that a greater degree of heart-felt satisfaction was scarcely ever more reciprocally experienced, or more cordially exchanged." He further says: "The principal object which His Majesty appears to have had in view, in directing the undertaking of this voyage having at length been completed, I trust the precision with which the survey of the coast of northwest America has been carried into effect, will remove every doubt and set aside every opinion of a *northwest passage*, or any water communication navigable for shipping, existing between the North Pacific, and the interior of the American continent, within the limits of our researches. The discovery that no such communication does exist has been zealously pursued, and with a degree of minuteness far exceeding the letter of my commission or instructions; in this respect I might possibly have incurred the censure of disobedience, had I not been intrusted with the most liberal, discretionary orders, as being the fittest and most likely means of attaining the important end in question."

On August 22, 1794, the ships quitted Port Conclusion and sailed for Nootka Sound, where Vancouver expected to be put in possession of the buildings and parcels of lands occupied by his British Majesty's subjects in the month of April, 1789. The surrender was to have been made by a representative of the Catholic King of Spain agreeably to the first article of the convention of October 28, 1790. Vancouver expected to meet Señor Quadra as the representative of Spain, but in this he was disappointed. He arrived at Nootka September 2 and found Brigadier-General Don José

Manuel Alva in command, and from him learned Señor Quadra had died. The necessary credentials for finishing the business between the two governments had not arrived nor did they arrive in time for Vancouver to carry out instructions before his departure from Nootka at midnight, October 16, on his homeward journey. Señor Alva sailed at the same time. Monterey was appointed as the rendezvous for both the British and Spanish vessels. They arrived at Monterey, November 6, and found no dispatches there for them. However, Señor Alva told Vancouver that his government had notified him that Spain would no longer resist the British demands but would settle the dispute according to Vancouver's construction of the Articles of Convention and that another English officer would receive the cession from the Spaniards. Lieutenant Thomas Pierce of the marines took the place of Vancouver, and he and Señor Alva sailed from Monterey, March 1, 1795, arrived at Nootka, March 23, and, according to the Articles of Convention, the Spanish fort was dismantled and the territory surrendered to the British.

The expedition returned to Europe by way of Cape Horn. At the island of St. Helena the ships parted company, the Chatham under Mr. Puget being sent to Brazil as the carrier of government dispatches. On Sunday, September 13, 1795, the Discovery anchored in the river Shannon, and Vancouver took leave of his officers and crew. In the course of a few days, he arrived at the Admiralty and deposited the documentary results of his explorations.

Vancouver, notwithstanding he was a stern and strict disciplinarian, was a tender-hearted and sympathetic man, and was constantly watchful over the welfare of

his men, and he saw to it that they received due recognition for the valuable services rendered by them. It was due to this that in closing his *Journal* he was able honestly to say: "From the first moment of my appointment, to the hour in which I resigned the station I had so long held, the health of every individual under my command had been my first care; and I had now the unspeakable happiness of beholding the same persons return on board of the *Discovery* to the river Shannon, in perfect health, as had sailed with me from the river Thames, excepting such of the officers as had officially been sent home, or had been promoted in the *Chatham*; the seventeen seamen left at St. Helena, to assist in navigating the *Macassar* to England, and the under-mentioned individuals, who were unhappily lost in the course of the expedition.

"John Brown, carpenter's mate, drowned by accident, in the execution of his duty, off the south foreland, 3d of February, 1791.

"Neil Coil, marine, died of the flux, communicated to the *Discovery*, at the Cape of Good Hope, by an infected ship from Batavia, 7th of August, 1791.

"Joseph Murgatroyed, one of the carpenter's crew, missing at sea the 21st of January, 1793.

"John Carter, seaman, poisoned by eating mussels in Poison cove, 15th of June, 1793.

"Isaac Wooden, drowned by accident, in the execution of his duty, off Wooden's rock, the 24th of August, 1794.

"Richard Jones, drowned by accident, in the execution of his duty, between the port of Valparaiso and the island of St. Helena, 21st of June, 1795.

"By this list it will appear that from the 15th of December, in the year 1790, to this 13th day of Septem-

ber, 1795, comprehending a space of four years eight months and twenty-nine days, we had lost out of our complement of one hundred men, only one man by disease; and at the time of parting with the Chatham at St. Helena, she had not, in the course of the whole voyage lost a single man, either in consequence of ill health, nor from any accident whatever."

After his return Vancouver was constantly employed, until a few weeks before his death, in preparing his *Journal* for publication. Concerning the amount of labor expended by him on his journal, his editor says: "The first five volumes excepting the introduction, and as far as page forty-three of the sixth and last volume, were printed; and Captain Vancouver had finished a laborious examination of the impression, and had compared it with the engraved charts and headlands of his discoveries from the commencement of his surveys in the year 1791, to the conclusion of it at the port of Valparaiso, on his return to England in the year 1795. He had also prepared the introduction, and a further part of the journal as far as page 408 of the last volume."

Vancouver died on May 1, 1798, in Petersham Parish, Surrey, and was buried in the parish cemetery. Plain oval head and foot stones mark his grave, the head stone bearing the simple inscription, "Captain George Vancouver died in the year 1798, aged 40."

The task of completing the explorer's story for publication was performed by his brother John Vancouver. The work was finally issued in 1801 in six volumes under title of *A Voyage of Discovery to the North Pacific Ocean and round the World*.

Vancouver's survey of the North Pacific coast were worthy of the best explorer of any time, and of an enduring monument. No other man under analogous

conditions, has given to the world a detailed survey of equal excellence of so many miles of intricate coast. His charts were those by which the coast was navigated for a century after his death. The only memorial which has been dedicated to his memory is a tablet in the little parish church which bears the following inscription: "In the cemetery adjoining this church were interred in the year 1798 the mortal remains of Captain George Vancouver, R.N. whose valuable and enterprising voyage of discovery to the North Pacific Ocean, and round the world during five years of laborious surveys, added greatly to the geographical knowledge of his countrymen. To the memory of the celebrated navigator, this monumental tablet is erected by the Hudson's Bay Company, March, 1841." A more enduring and worthy monument to his memory than this is the fact that his name has been given to the largest island off the west coast of North America.

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